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MAY 1969 THE NAVAL AVIATION SAFETY REVIEW

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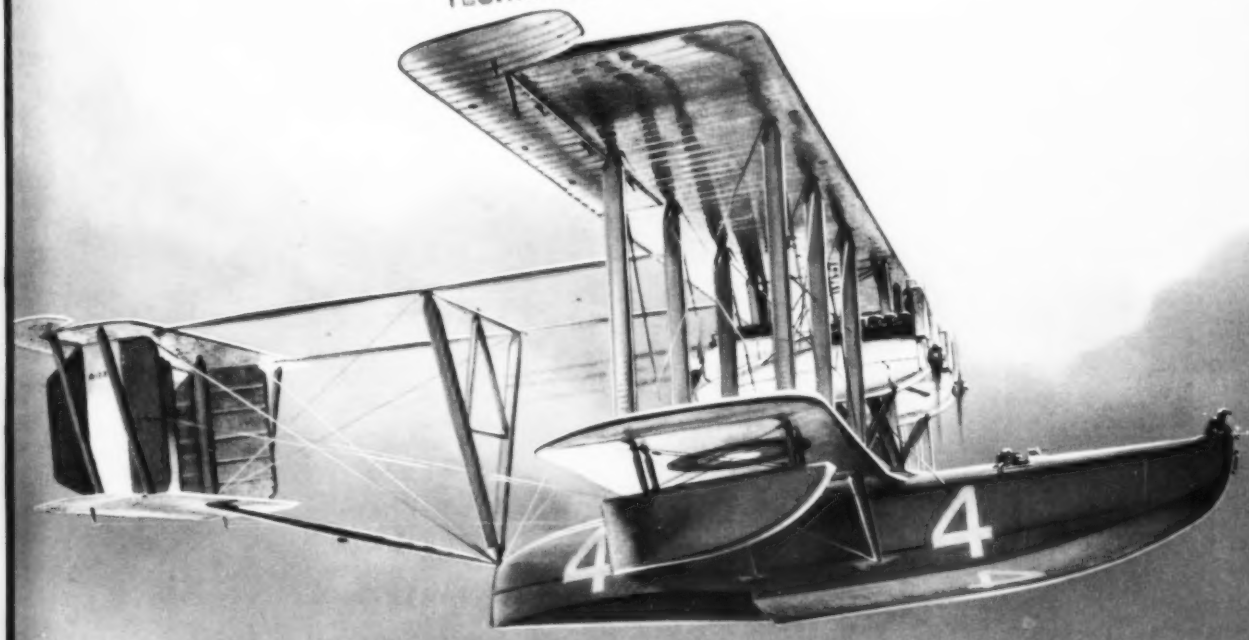
JUN 16 1969

TECHNOLOGY & SCIENCE



The Flight of the NC-4

This month we celebrate the 50th anniversary of the first transatlantic flight by the U.S. Navy flying boat, NC-4.

On May 31, 1919, Lieutenant Commander A.C. Read, USN, the pilot of the NC-4 stepped ashore at Plymouth, England, marking the end of the historic flight which covered 3936 nautical miles in a total flying time of 52 hours and 31 minutes.

What did the flight accomplish? It gave the watching nations of the world a spectacle of imperishable gallantry. The bravery of the attempt, the persistence under hardship and the indomitable courage of those involved in this first transatlantic flight will long be remembered.

It showed that the Atlantic, like other barriers to the growth of aviation, could be broken down; that flight has no limit in the tasks it may choose and accomplish.

The NC flight charted a pioneering course through new regions. The careful and extensive organization and planning which characterized the flight provided an object lesson which has been of inestimable value to naval aviation during the intervening 50 years. During this time we have made great strides in our efforts to make flying as safe as possible. Looking back to the time of the flight, aviation was still in its infancy. There may have been a bit of the historic devil-may-care attitude in aviators of the time; however, the design, construction, planning and flight of the NC flying boats show clearly that safety was an important consideration in this tremendous undertaking. They were concerned about safety and provided as many safeguards as possible, considering the times. Crewmen were equipped with telephone linemen's safety belts which they used when climbing out onto the wings to inspect engines and rigging. The pilots had seat belts in their cockpits but they were the only crewmembers to be so equipped. There were no rafts aboard the aircraft, perhaps as a consideration of weight control but destroyers were stationed along the route of flight at 50-mile intervals as an aid to navigation – and survival in the case of trouble.

The flight was a drama of the human spirit, too. Let us imagine ourselves in the pilot's cockpit of the NC-4 as she makes her way eastward at 600 ft altitude.

The course is the open sea. There are no rivers or railroads or coastlines to follow, no towns or lakes to identify. Only a line of 60 destroyers, clicking advice and brandishing stiff antennae of light to break the empty sweep of the sea.

In the late light of those first hours the waters are smooth. The deflected glow of a sunset fills the sky. Icebergs swim by under our wings.

All sound is merged into a roar of four motors. All about us is a sense of space – open, illimitable, so vast that we seem shaken free forever from the earth and winging in a new world whose laws are alien to all we have known.

The sky is now dark, utterly dark save for the stars. These and the line of the ocean where the stars cease, give us our only means of orientation. Each of the engines' exhaust ports, unmuffled, sends out a jet of flame as the burnt gas is expelled. In the vastness and invisibility of time and space, each of those red tongues proclaims the adequacy of its cylinder 850 times a minute. It is marvelously reassuring. The engines labor on until . . . finally, the flight is ended. Through planning, the marvelous ingenuity and tenacity of designers and engineers – and raw courage, the age of transoceanic flight is born.

Safe Terrain Clearance

The Pilot's Responsibility

A UNIQUE ACCIDENT occurred when the pilot of an aircraft on a low-level sandblower flight pulled up to clear the top of a mountain – only to crash into the top of a smaller peak during a rapid (and premature) descent on the other side of the mountain. An obvious case of failing to maintain adequate terrain clearance but it does not quite fit the category of accidents we wish to discuss here. We have in mind the more insidious type of circumstance where, because of poor planning or complacency, the terrain sort of sneaks up on you.

What do we mean by this? A flight of two F-4Js was practicing low-altitude intercepts at night under the close control of a ground control intercept agency. Having completed three low-level intercepts, the aircraft were being vectored for separation purposes. One aircraft was given a turn but halfway through the turn the controller lost both radio and radar contact with the aircraft. It was later determined that the aircraft had impacted with the side of a hill, in a slightly nose-high attitude, a few feet from its crest.

The subsequent investigation was thorough and brought out many pitfalls and inadequacies in existing procedures, both in the squadron and the controlling agency. For example:

- A review of squadron ground training lectures, low altitude intercept briefing sheets and interviews with other pilots revealed that the training syllabus did not include any written information concerning terrain elevations in the area where the crash occurred (in this case an off-shore island).
- A review of the controlling agency's ground school lectures and interviews with supervisory personnel revealed that no information was given to student controllers during the course of training on either the coordinates or elevations of the island where the crash occurred.
- It was determined that on two occasions the flight was outside the operating area of the controlling agency but no radio transmission was made by the controlling agency to inform the aircraft of this deviation. The crash, in fact, occurred outside the boundary of the established operating area. Subsequent to the crash, a reconstruction of the actual radar scope picture was

attempted. During this time it was discovered that the radar scope had a three-mile error. Although it cannot be said that this was the case at the time of the accident, it is a possibility.

As a result of this investigation, action has been taken to effect better coordination between the controlling agency, the squadron and other units in the area in order to correct existing discrepancies and to establish operating procedures which will result in maximum safety and training for all concerned.

We have not mentioned, up to this time, that the pilot was operating in VFR conditions. We do so now to emphasize the importance of the pilot's responsibility to insure adequate terrain clearance. The weather in the operating area was clear, visibility 10 miles plus, no horizon – and very dark! Under these circumstances, even though the pilot was technically VFR, he could be expected to be monitoring his instruments a high percentage of the time. This would be necessary in order to keep from flying into the water, if for no other reason.

Still, all this discussion does not adequately dispose of the matter of pilot responsibility. He retains this responsibility to a high degree under any and all conditions – VFR or IFR. In this case, the pilot failed to determine the nature of the terrain over which he was conducting night, low-level operations. It's possible that he rightly expected more help from the air intercept controller in the matter of terrain clearance than he received (he was under *close* control); however, the pilot was not thereby relieved of his own responsibility for proper planning and conduct of the flight.

Complacency

The lack of flight planning (failure to determine the nature of the terrain) brought out by this accident can only be the result of complacency. This is a hazard hard to overcome. The insidious thing about complacency is that often the older, more experienced pilot may be the most susceptible. One particular situation comes to mind: the matter of lost communications while under radar control. Although a loss of communications can be a serious matter any time an aircraft is being controlled by ground radar, we have in mind the situation where an aircraft is making an approach to, or departing from, an airport.

A very highly experienced pilot may even become complacent to the extent of being bored with the whole approach procedure; after all, he may have done it many many times during the last few months. He may lapse into the habit of letting important information such as lost communications and missed approach instructions, go in one ear and out the other without really digesting its import because he doesn't expect anything to go wrong anyway. Moreover, he may feel that if anything does go wrong he will be equal to the situation – whatever it is. This may be particularly true when operating around home field. Both pilots and controllers may evidence a tendency at times to abbreviate patterns and procedures because they have become complacent. But a word of warning – don't do it! If you are operating in an area containing elevated terrain it may take only a matter of one or two minutes to fly your aircraft far enough to put you below minimum safe altitudes. If you are sitting there, head up-and-locked, while on a vector . . . . maybe distracted by something in the cockpit . . . . you may not recognize that anything is wrong at all until the view of that big, black hill fills the windscreen.

A missed approach is another time when the pilot dares not relax. It occurs at one of the most critical points in a flight – usually as the pilot divides his scan between the inside and the outside of the aircraft and strains to pick out the runway at minimums. If the pilot does not hold the runway at that time he is immediately subjected to a multitude of pressing demands. He has to transition back to complete reference to instruments, set power, transition to a climb, clean up the aircraft and turn to the proper heading.

If he receives vectors for another radar approach at this time, he can be in gross trouble in short order should he lose communications and fail to recognize it. His salvation may lie in having done his homework (flight planning) so well that he knows just about all there is to know about the surrounding terrain. Of course the approach plate will give him minimum safe altitudes for the area but the insidious part of the

Remains of E-1B showing tragic results of failure to maintain safe terrain clearance.

problem is that if he sits there, complacently tooling along, by the time he realizes he is on his own (no communications) and starts checking the plate, it may be too late. It can happen and it has happened. NavSafeCen accident files bear this out. If a pilot has prepared himself with a thorough preflight study of the area, the fact that there is high terrain or obstructions nearby will usually operate to produce the proper tension to keep the wheels turning.

SIDs (Standard Instrument Departures) should also be executed with care. If flown as depicted or specified safe terrain clearance is assured but if you are flying a dog which climbs at 200 ft per minute you may not make it. If you have some aircraft disability which causes you to diverge from the depicted departure – well, there goes any guarantee of safe terrain clearance offered by the SID. Furthermore, if some confusion develops in the cockpit right after takeoff on a SID you could run into a TV tower or hill in short order if it causes you to delay turns or fail to initiate climbs at proper times and places.

The hazards of complacency, which are sometimes nurtured by operations in a radar-controlled or radar-monitored environment, are further illustrated by the report of an E-1B accident. In this case, too, the pilot obviously expected more help than he received – with tragic results.

Night Carqual Bingo

It was a black night for carquals and the crew of the E-1B had been up since early morning. After their second night carqual period the ship held the aircraft on board for about an hour for refueling prior to bingoing them to homeplate. During this hour before the final launch the flight crew visited AirOps for course information and the ship continued to cruise steadily on a southerly course.

After the refueling was completed and the E-1B launched, a report was made to departure control. After a query as to the time enroute and the fuel state, departure control cleared the E-1B to climb to enroute altitude and advised the aircraft that homeplate was on a *bearing of 113 degrees, 89 miles.* Continued

The aircraft climbed to 1500 ft and levelled off. At this time the weather around the ship and enroute to homeplate varied from 2000 scattered to 1500 broken, with light rain. And it was dark. So dark, in fact, that the crew of the E-1B was unable to make out the horizon or see the stars or moon . . . . *or* the steep slope on the island which the aircraft plowed into at 1500 ft in straight and level flight only 12 short minutes after takeoff. The site of the crash was on a *bearing of 115 degrees from the ship.*

It's pertinent to note here that the bearing and distance information furnished by the ship was, technically, *advisory* rather than *directive* but as we said, this pilot *expected* more help from the ship than he received. How did this expectation come about in the first place? It was probably due in large measure to complacency which was undoubtedly nurtured by flying two previous night carqual periods in a radar-monitored environment; having a well-qualified plane commander sharing the cockpit duties as copilot and from having operated during the previous carqual periods with abbreviated prelaunch information. Under these circumstances the pilot probably considered the subsequent bingo to homeplate as a routine flight. This is borne out by the pilot's apparent failure to either ask for or attempt to locate any preflight data except for that furnished by the ship – which turned out to be woefully inadequate.

It is significant that during the pilot's previous carqual period the ship was operating in an area well to the northeast of the final launch position. That is, during the hour that the aircraft was aboard being refueled, the ship steamed about 15 miles in a southerly direction. Unfortunately, preflight data furnished the pilot by CATCC did not include the ship's PIM (position of intended movement) or any information concerning restrictions or hazards to flight, i.e., minimum safe altitude over offshore islands along the route of the proposed flight. Moreover, the bearing and distance to destination information passed to the readyroom was modified twice during a short period of time prior to the launch. Finally, the bearing and distance to homeplate furnished to the pilot immediately after takeoff was in error because the ship's position had moved about five miles from the position which was used to compute the data.

For these reasons and others (which space does not permit us to recount), the ship was listed as a contributing factor in the accident; however, the pilot in command failed to insure an adequate and proper briefing, to thoroughly plan his mission and maintain safe terrain clearance along the route of flight.

The Need for Flight Planning –
'A Classic Illustration'

Another accident which occurred in an operating area outside the United States, involving a C-1A aircraft, shows most clearly the part which flight planning plays in maintaining safe terrain clearance. In this case the aircraft took off after filing a flight plan which provided for IFR flight from the point of takeoff to Pt. A to Pt. B; thence, operational to destination which was a ship located off-shore (see accompanying diagram).

The flight was cleared essentially as filed with IFR clearance to Pt. A via SID; to Pt. B via airways; to the ship via "operational." The requested and assigned altitude was 5000 ft.

Everything went fine during the first two legs of the flight. When the aircraft passed over Pt. A it was directed to contact Pt. B approach control when 25 miles north of Pt. B. Actual communication was established with Pt. B approach control when the aircraft was 10 miles north of Pt. B. At this time the pilot was advised that there was no reported traffic and was instructed to report leaving the Pt. B MTCA (Military Traffic Control Area) 25 miles south of Pt. B. No further transmissions were ever received from the aircraft. When the aircraft failed to report leaving the Pt. B MTCA (25 miles south of Pt. B) the controller was not unduly alarmed as he knew that the aircraft was filed operational from Pt. B to the ship and he assumed that the report, if made, had been blocked out by mountainous terrain south of Pt. B – a common occurrence.

When the aircraft failed to arrive at the ship a search was initiated. The wreckage was located at the 6000 ft level of a mountain, 12 miles south of Pt. B.

The investigation revealed that the weather from takeoff to Pt. B was essentially clear. South of Pt. B there were cumulus cloud build-ups over the mountains, reported as 3/8th coverage. From the investigation it appears that the pilot passed Pt. B at 5000 ft, proceeding southbound under VMC (visual meterological conditions). At a point six to eight miles south of Pt. B the pilot probably considered the mountains which were visible under the clouds to be too high for the aircraft to pass beneath the cloud bases, so he started to climb to maintain VMC on top. It appears that although the pilots could see they would have to penetrate clouds temporarily during their climb, they chose to do so not realizing the clouds obscured mountains which rose from about 5000 ft to a height of about 8000 ft within two miles of where they entered the clouds (as fixed by witnesses on the ground).

The AAR Board concluded that the primary cause of

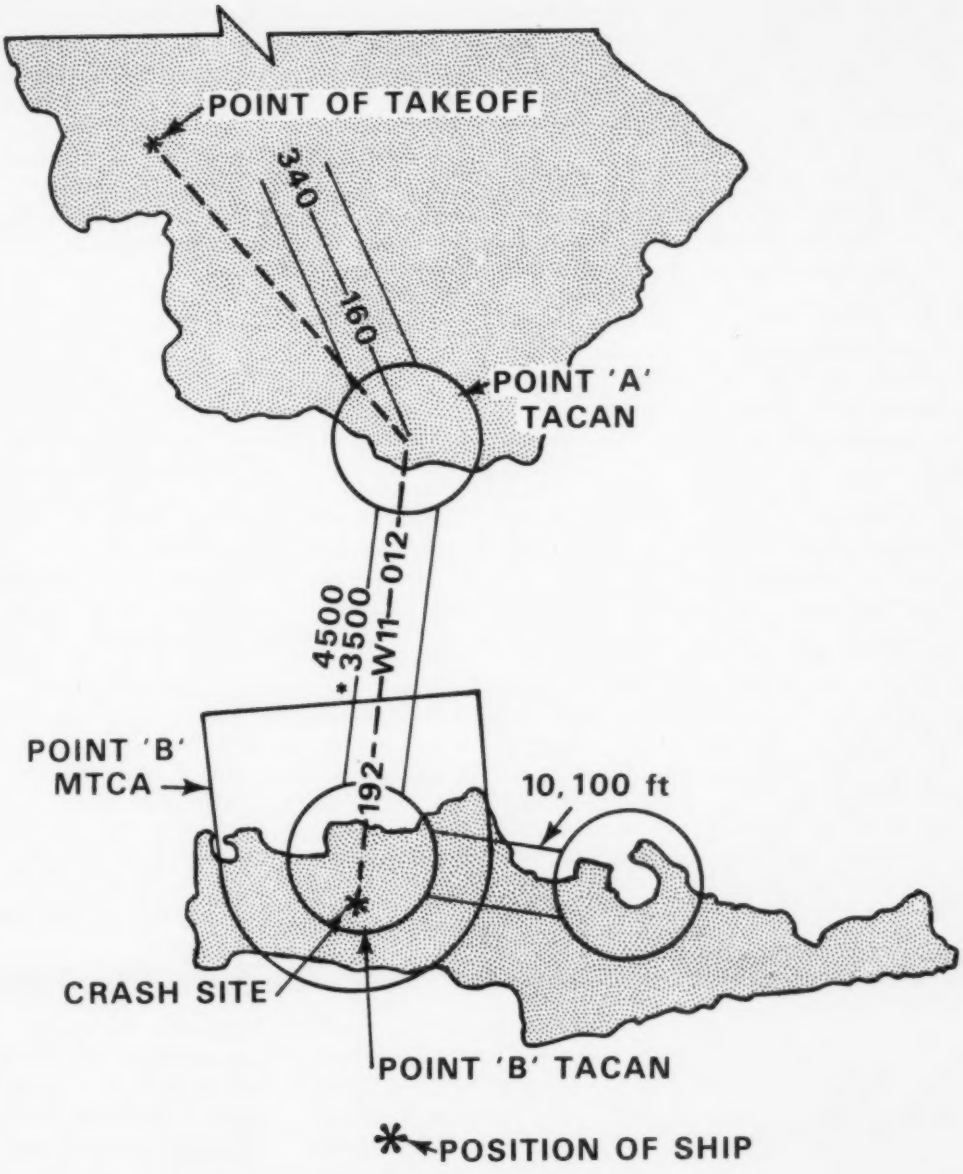


Diagram showing route of C-1A flight.

this accident was pilot factor in that he was not aware of the altitude required for safe terrain clearance along the filed route of the flight. This was evidenced by the fact that the aircraft, with no apparent malfunction, entered the clouds and 30 seconds later struck a mountain at the 6000 ft level in the vicinity of mountains which rose up to 8050 ft.

In addition, contributing causes were assigned. It was considered that the DOD FLIP low altitude enroute chart was in error in that the Pt. B MTCA contained no information as to the terrain height in the MTCA. It was further argued that since the minimum enroute altitude as shown on the airway proceeding inbound from the north to Pt. B tacan is 4500 ft, a pilot departing south

from Pt. B tacan could falsely assume that an altitude greater than 4500 ft would provide adequate terrain clearance. Accordingly, it was subsequently recommended that the FLIP low altitude enroute chart for the area be modified to include a minimum safe altitude within the Pt. B MTCA. This recommendation was disapproved by CNO for reasons which are stated, in essence, below:

(1) Such action would require a change in the chart specifications making depiction of minimum altitudes mandatory for all TCAs (Terminal Control Areas) and MTCAs. Changes in chart specifications would require the concurrence of the other military services and approval of the DIA (Defense Intelligence Agency) which is the overall manager for DOD mapping and charting matters. Assuming Army and Air Force concurrence and DIA approval could be obtained, the problem of meaningful depiction of minimum altitudes in these areas arises. Some TCAs/MTCAs cover large areas in which wide variations in terrain height occur. Therefore, sectorization (with attendant chart clutter) would be required to avoid depiction of unrealistically high minimum altitudes in many areas.

(2) The DOD FLIP charts are not intended for VFR navigation; however, the minimum safe altitude within 25 nautical miles (9200 ft in this case) is shown in the FLIP (Terminal) Low Altitude Instrument Approach Procedures book.

(3) Depiction of the minimum altitude in the Pt. B MTCA could possibly have prevented *this* accident because the southern boundary of the area extends beyond the coast line. However, had the land mass extended 50 miles farther to the south (beyond the Pt. B MTCA) and had the terrain reached an altitude of, say 12,000 ft, outside the MTCA, the results would have been the same, assuming the pilot flew into IMC (instrument meterological conditions) at 9200 ft (minimum safe altitude for the Pt. B MTCA).

(4) Even a cursory look at the FLIP enroute low altitude chart in the area of Pt. B will indicate high terrain to the east (10,100 ft minimum altitude along the airway (refer to diagram)). In fact, part of this airway (to which the 10,100 ft minimum enroute altitude applies) lies within the Pt. B. MTCA less than 25 miles from the accident site. This alone should have alerted the pilots to the possibility of high terrain along their intended flight path.

(5) This tragic accident is a classic illustration of what happens when pilots fly into IMC while operating in accordance with visual flight rules without first ensuring that they have adequate terrain clearance. This is solely the responsibility of the pilot in command. In lieu of putting additional information of doubtful value on the already cluttered FLIP charts, the circumstances of this accident should be widely publicized to all naval aviators, with emphasis on the requirements of complete and thorough preflight planning.

We have ranged rather far afield in our discussion of safe terrain clearance. We could go further, citing more accidents, discussing pilot-controller relationships, minimum altitudes, radar control procedures, ad infinitum. However, we would not be able to develop any thought more pertinent than the one already stated: The pilot has the unalterable responsibility to maintain safe terrain clearance during all conditions of flight. This requires a substantial knowledge of flying regulations and procedures, thorough flight planning and good headwork. Complacency is the mortal enemy of all three.

On your toes!

Multi-Engine

THE advantage of having more than one engine in an aircraft is well known and was clearly demonstrated one day when the pilot of a CH-46 was tooling along with a load of troops high over the Vietnam terrain. While enroute the pilot heard a loud banging in the aft section and the crew chief reported that pieces of metal were falling out of the No. 1 engine. The pilot secured the engine and continued on the other engine to his destination where he made a routine landing.

Investigation revealed that the aft flex plates on the engine drive shaft had separated at about the midpoint of the shaft. The left-hand aft engine mount pulled away and the engine exhaust extension also broke away from the engine. The other aircraft in the squadron were inspected and one other plane was found with cracked aft flex plates – it was fixed.

Pending incorporation of this item in MRCs, it is suggested that all operators of the H-46 model do as this squadron did – add this area on all preflight inspections. Pilots and plane captains will need a flashlight for this inspection, however, because you can't see this area without one.

ON THE GLIDE SLOPE

Ask Yourself

WHEN filing for instrument flight, are you prepared for any eventualities along your route of flight? Are you truly a professional aviator who plans his flight on the ground and is well versed in procedures? Or are you dependent on other members of the flight or flight controllers? Worse yet do you say "if that situation arises I'll look it up in the air?" You should know the answers. Put yourself in the below listed situations and then ask yourself:

1. You're in a turbojet enroute descent with no specific lost communications instructions and you lose your radio. Ask yourself – what do I do?
IFR Supplement Procedures Section, Emergency Procedures, paragraph C10.

2. You've been cleared to hold *northwest of the 20 nm DME* fix on the 140-degree radial. In the pattern, what is your heading inbound to the fix? Go ahead, ask yourself.
Airman's Information Manual, chapter 2, Enroute Section, Holding Subsection, paragraph 2.

3. You arrive at an IAF, with the aircraft adversely aligned for the initial approach course. Did I hear you ask yourself how the aircraft should be maneuvered?
FAA order 7130.1A, paragraph 8 and NATOPS Instrument Flight Manual, page 4-11.

4. In holding, with an EAC, you lose communications. You ask yourself when you should leave the holding pattern, (a) when the IAF is within the holding pattern or (b) when the IAF is outside the holding pattern.
IFR Supplement, Procedures Section, Emergency Procedures, paragraph C4 and C5.

5. When you filled out the DD-175 (IFR), did you ask yourself if the last fix in the route of flight was the IAF and does the ETE include delays? What about stop over flight plans by the way?
FLIP Section 11-43 and IFR Supplement Procedures Section, Emergency Procedures C7.

6. A pilot in a single piloted aircraft asked himself if he could commence an approach when the prevailing visibility was reported as 1/4 mile but the RVR was 24. Well?
OpNavInst 3710.7D, Section 563.

7. Glideslopes vary from place to place and rates of descent for a GCA vary accordingly. Ask yourself if you know the rate of descent for the next GCA?
Low Altitude Instrument Approach Procedures, page IX.

8. You are on a radar vector off of your planned route of flight and lose your radio. All you can hear is yourself asking where to go. Where?
IFR Supplement, Procedures Section, Emergency Procedures, paragraph C1. FAA Air Traffic Control Procedures Manual 7110.9, page 91.

If you have any questions concerning instrument flight ask us. Send them to Commanding Officer, VA-127, NAS Lemoore, California 93245. Then, on that dark, rainy night when one of the above problems confronts you, you won't have to ask yourself, is he the only guy around who knows the answer?

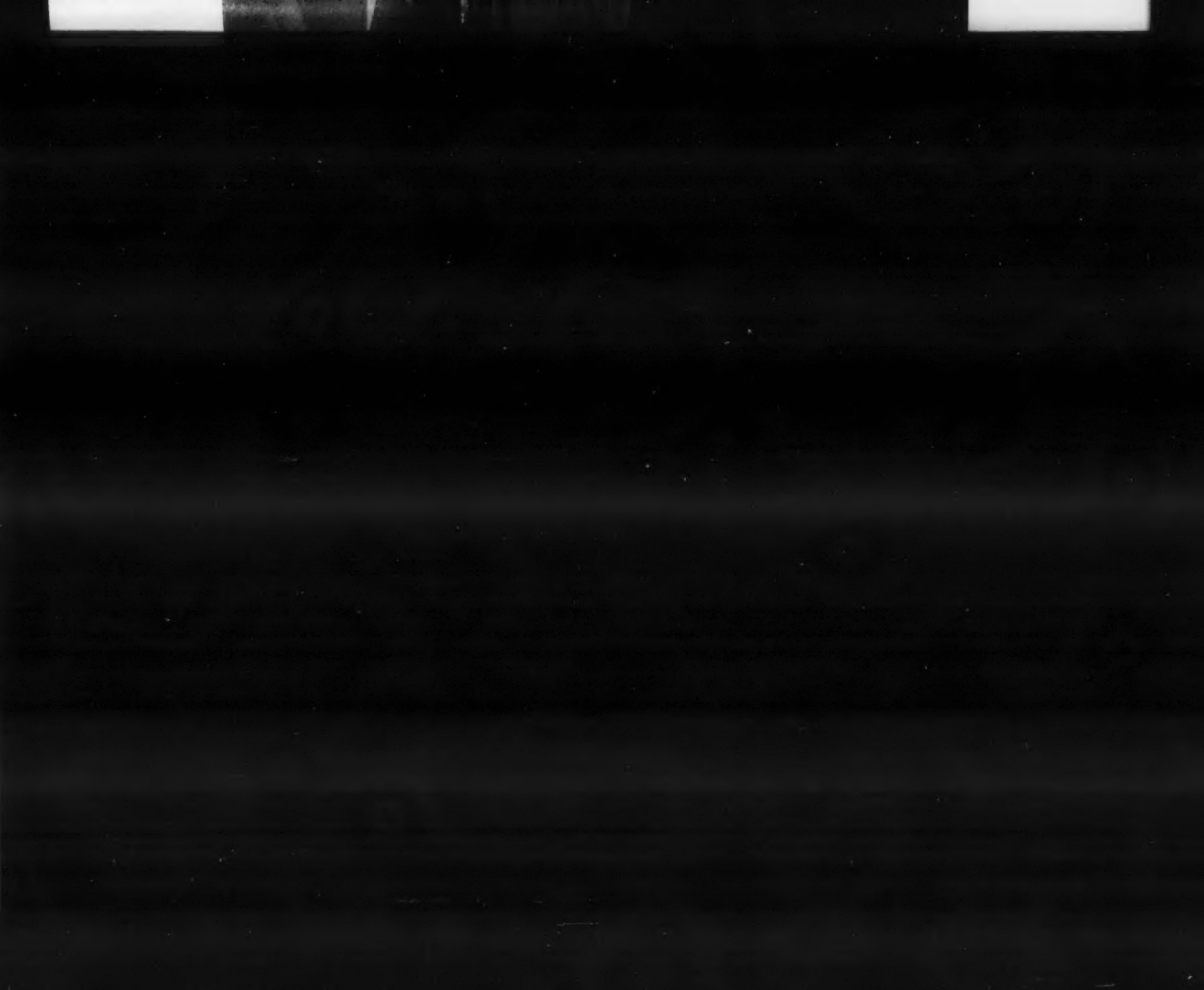
MECH Available By Subscription

Beginning with the Summer '69 issue, MECH, the magazine for naval aircraft maintenance and support technicians will be available to the public through private subscription. Industry, publishers not on the Exchange List, Reservists and others having a need for personal copies may order the magazine from the Division of Public Documents, Government Printing Office, Washington, D.C. 20402.

Subscription rates: Single copy, 75 cents; 1-year (4 issues) $3.00.

FOR ASO EYES ONLY

PERHAPS the easiest and most reliable way to evaluate the safety status of a command, station, ship or squadron – is through a safety survey. Air stations and ships supporting tenant squadrons plus their own CRT or mission support aircraft, as well as the squadrons themselves, must be ready to assess their own safety status in order to meet the challenge presented by the maxim, Readiness Through Safety.



THE SAFETY SURVEY is indeed a survey and not an inspection. It is conducted by the aviation safety officer for his commanding officer. The results are made known to the command only and the degree of follow-up action, where needed, is at the discretion of the command.

General Requirements

The requirement to conduct a survey as well as its frequency will depend on several variables. If you are a squadron ASO you may desire to plan your surveys to coincide with deployments aboard ship or at bases outside of ConUS. By the same token it might be advisable to plan another survey upon redeployment to your home base in the states. If you are assigned as ASO to a Naval or Marine Corps air station and no deployments are involved it's probably easier to time your surveys with the coming of seasons such as a spring and fall survey. Generally, the commanding officer and his ASO will discuss the ground rules and frequency of the survey before it gets under way. If a good cycle has already been established by a previous C.O./ASO then it's best to continue with it unless you feel you have a better mouse trap.

Over the years several formats have been developed for the survey. Fighter and attack, VP and VAH, have all had different survey formats; however, these formats may not have been adequate for an air station so many air stations have developed their own. At long last, the Safety Center has provided a common survey form that meets the needs of everyone. That's a pretty big statement but it's true. Between the covers of the NavSafeCen Safety Review Checklist you will find survey material to cover ship and shore based operations, maintenance, facilities, standardization and training and Aero-Medical (Life-Sciences to the purist) areas. There are even sections on command level and aviation safety officer's functions so you can be sure everyone gets a close look. A survey as detailed as this would have landed Tail Spin Tommy or Roscoe Turner in hack for a month.

The safety survey is an attempt to give the C.O. a hard and close look at his aviation operation in order to assess the effect of his safety program. To do this, every function that touches the aviation community deserves examination. On an air station this includes literally every department and in a squadron it's the whole ball of wax.

Preparation

Besides donning a suit of armor and hip boots, the ASO should prepare a brief memo to the C.O., XO and department heads announcing the semi-annual (or what ever schedule you're on) safety survey and also providing

a timetable so that a department head can arrange to personally chat with the ASO during his visit. That all sounds rather cozy, but you better plan on seeing the man in charge if you want to get the most out of your survey. If there are discrepancies in a particular operation, the department head should know about them as soon as possible. Never keep things to yourself figuring that the element of surprise (when the C.O. brings it to his attention) will finally get a particular individual into high gear. If you operate this way, better plan on walking around in groups of three or four.

Conduct

Following your timetable, start at the top of the list of places to survey and move as rapidly (and thoroughly) as possible from one area to the next. Don't let the survey drag if it can be avoided. Ordinarily you would start at the front of your survey form and go through it by sections. If you use the NavSafeCen checklist in your survey you can take advantage of the simple coding system for answering the survey questions during a subject interview by placing the appropriate code letter after each question as it is answered. The letter N means Not applicable to this activity, C means Complete or in effect and R means Requires further action. Later on you can elaborate on each item in the privacy of your office or whatever cubby hole you call your place of business.

Prior to full engagement in the survey prepare yourself mentally for the reactions to your probing questions. A little one-upsmanship here is in order. As a red-hot ASO you probably already know where the problems are. Be prepared to give suggestions to people in a way that will lead them to believe they have thought of them. Don't leave the place as though a tornado had just passed through. Realize that some people will tend to reject the implication that there is something unsafe about the way they do their jobs. Always assure the officers and men you are interviewing that it's their safety you're concerned with and not your

own – directly. Show honest concern for them and your survey will be much more profitable to the command.

As to the depth of the survey, this depends on what you find on the surface and how much you know about the individual areas of the survey. If, for example, there have been grumblings in your unit about inadequate flight lunches from the general mess or difficulty in obtaining ATC clearances from the local tower, you'll want to investigate to determine if your unit's procedures in procuring lunches or filing flight plans is correct.

It is true that the survey will educate you as you conduct it, but don't go in cold and expect to get the facts all neatly packaged without first priming yourself with a little knowledge. There will be folks who will resent (yes, resent) the survey, who will play the role of the clam and say nothing, allowing you to draw your own conclusions about what it is that you're looking for. These folks are simply dragging the outfit under by their own shortsighted attitude. Your job: change em!

To produce a complete and accurate survey, one that will give the C.O. the information and confidence he needs, will require you to get your hands dirty. Expect to get down on your hands and knees and use a flashlight too. You'll be looking at ground support equipment, fuel trucks, snow plows and examining emergency generators for towers and field lighting. You'll be on the runway checking for holes in the runway surface, insuring overruns are solid and conform to standards, looking for illegal obstructions or obstructions not properly lighted or marked and a host of other items that must be attended to in order to insure a properly constituted and operating facility.

Squadron ASO's are every bit as concerned about facility conditions as the station ASO. Get together and conduct a joint inspection of facilities such as fuel pits, taxiways and runway lighting. There is no area too small to escape attention. Be as diplomatic as possible in the conduct of your survey, but if the maintenance officer or public works officer feels you are in an area of his sole responsibility and that you are trying to violate his knickerbockers, look sharp. Under this set of circumstances your best bet is to back off and pass on this type of a problem to your C.O. when the survey is complete.

Results

It follows that upon completion of the survey you will have amassed a small mountain of paperwork. The paperwork will consist mainly of deciphering your notes, comparing the results of your current survey with those of the last and, of course, preparing a report to the C.O.

What do you tell him? You can spend a lot of time trying to decide which to give him first; the good news or the not so good news. Here is a simple way of doing both. Take survey form in one hand and pencil in the other (an additional decision is involved if you are ambidexterous) and note the results. It is better to summarize the report than to drag out the process of interpretation by using an item, discussion, recommendation format unless you believe in the theory, strength in length.

The NavSafeCen Safety Review Checklist may be obtained by writing, or calling: Commander, Naval Safety Center, NAS Norfolk, Va. 23511, Atten: Safety Education Department. Telephone: Commercial 703-444-4279 or Autovon 244-4279.

It is well to remember at this point in your survey that it is as important to comment on those areas where no problems exist as it is to point out areas of unsafe or hazardous operations. Your report should be complete with suggestions as to corrective action to be taken and copies should go to each department head. Remember, it's the C.O.'s station, ship or squadron. It's his safety program and you are his manager as the ASO. Everyone else in the outfit is working for the C.O. just like you and when you conduct your survey you are conducting it for him. Some of the people you will contact in the course of the survey may not agree with this philosophy but it's true. It becomes apparent to some only when the survey results have been consumed by the C.O. and he starts a little down hill traffic in the direction of the folks who are reluctant to deal with the ASO.

Follow-up action may take the form of a memo to the department head detailing areas that need improving so as to meet current safety standards. Many cases will require that you, as ASO, outline action to be taken in improving the safety of a particular operation. Be specific in your recommendations and use references to make your points.

The safety survey is the C.O.'s preflight of his command and should be conducted with the same thoroughness as an aircraft preflight. An aircraft which cannot pass a preflight is not ready for flight. By application of the same principle, the safety survey will help the C.O. determine how well his squadron, ship or station is prepared, safety-wise, to carry out its mission. Each individual in the organization has a safety responsibility and the safety survey will help the C.O. determine if everyone is pulling his weight. ◄

Freak Accident:

"There are no isolated cases.

The first failure constitutes a trend."

IT'S been aptly stated that, "A mid-air collision can spoil your whole day." But more than that, it can ruin your whole life.

It has also been stated that most mid-air collisions occur between aircraft in the same formation. This is true; however, if this brings to mind visions of gentle scrapes between tiptanks or minor nicks to sundry aircraft parts, you should disabuse yourself of such notions at once. Most aircraft mid-air collisions involve serious damage and often result in the loss of life. For while it's true that most mid-air collisions occur between aircraft in the same formation, it is also true that most collisions develop to the point of inevitability because at least one of the pilots – and usually both pilots – have lost sight of the other aircraft at a critical time. Therefore, it is no more satisfying (nor safer) to collide with a friend in the same formation than it is to run into a complete stranger.

Be that as it may, the fact that most collisions occur between aircraft in the same flight does offer some hope for improving the chances for avoiding a mid-air collision. This can be done by taking pains to keep all elements of the flight working in close coordination from chock to chock. Such coordination can best be achieved by a careful preflight briefing of all events scheduled to take place during the flight, the positions of each aircraft within the flight, call signs, rendezvous points, altitudes, directions of flight and operating areas to be used.

The chances for avoiding mid-air collisions can also be improved by refusing to engage in impulsive, unplanned maneuvers. You may not believe it but one mid-air collision is on record where two high performance aircraft collided while performing nose-high recovery maneuvers – in formation!

Another leading cause of aircraft-in-the-same-flight formation collisions is the propensity of some wingmen to fly formation while they have their heads buried in the cockpit, setting clocks, studying charts or writing on their kneeboards. Such cockpit duties are important at times, even for wingmen, but when it gets down to the nitty-gritty you are better off without doing any of these things if it means you are unable to keep a proper watch on all other aircraft in the formation.

Improper lead change procedures still cause some mid-air collisions. This is most often due to a lack of

understanding of signals or a failure to use proper signals.

Collisions occur from time to time when an aircraft joining a formation does so with an excessive closing rate and overruns the formation. Usually the offending aircraft will miss the formation on the first pass but will manage to collide with someone during the subsequent attempt to correct for the overshoot. In these cases it is better to pull out to a safe distance and start a new join-up rather than try to salvage one which is already botched up.

Tactical maneuvering still accounts for too many mid-air collisions. Because of the high closing speeds and unusual angles, particular care must be exercised here. A special hazard is the fact that when several planes are involved in tactical maneuvering it becomes increasingly difficult to keep everyone in sight. Be warned and don't be afraid to coordinate altitudes and positions by use of radio when indicated.

So far we have talked primarily about aircraft in the same formation. We should not lose sight of the fact that strange aircraft also pose a substantial threat of mid-air collision. Obviously the threat is increased when operating in or passing through intensive training areas or high-density traffic areas.

The best system yet devised for avoiding other aircraft is a good lookout. Some aircraft have a greater lookout capability than others because of the aircraft size and cockpit design. So, if you fly an aircraft with a good lookout design and capability, you owe it to yourself and others to use this lookout capability to the fullest. As for the pilot who flies an aircraft with a poor lookout capability, well, you know what that means . . . you don't want to *waste* even one iota of your limited lookout capability.

Another important factor in avoiding aircraft collisions is maneuverability. It's generally recognized that the more maneuverable the aircraft you fly, the more responsibility you have for avoiding other aircraft in a specific situation.

FAA Near Mid-air Collision Study

As most readers are aware, the FAA conducted a study of near mid-air collisions during 1968. Some readers may not be aware, however, that this study has been extended for an additional year, through 1969. A recent FAA statement on the subject is pertinent:

"The FAA is extending for another year its 1968 policy that established the reporting of near mid-air collisions. Extension of the policy for another year is considered appropriate since the final FAA report based on the 1968 study and the resultant evaluation of the data assembled will not be issued until sometime in 1969.

"Accordingly, the Administrator will take no enforcement action or other adverse action, remedial or disciplinary, against any person involved in a near mid-air collision that is reported to the FAA during the extension of this policy. This action is taken under his statutory mandate to promote safety in flight. Furthermore, the Administrator will, upon written request of the person making the report, withhold that report and the identity of those persons involved from public disclosure in accordance with section 1104 of the Federal Aviation Act of 1958.

"Therefore, it is the policy of the FAA that if any pilot of an aircraft involved in a near mid-air collision reports the facts, conditions and circumstances thereof to the FAA:

- The Administrator will not subject any person involved in the near mid-air collision to enforcement or to other adverse action, remedial or disciplinary, even though a violation of the Federal Aviation Regulations is disclosed by the report or subsequent investigation; and
- Upon written request of the person submitting the report, the Administrator will, to the extent authorized by Section 1104 of the Federal Aviation Act of 1958, withhold the identity of the person involved in the near mid-air collision and the information contained in that report from public disclosure.

"This policy applies to near mid-air collisions which occur from 1 January 1969 to 31 December 1969, inclusive."

The FAA study is fully supported by the Department of Defense. Further details on Navy reporting procedures are contained in OpNavNotice 3750 dated 6 Jan 1969.

Mid-air collisions are a serious threat to naval aviation safety. The solution to the problem; that is, the complete elimination of all mid-air collisions, is not apparent. Nevertheless, naval aviators can do much to minimize the problem by using good headwork and by keeping a good lookout at all times. ◄

SEEK

SOMETHING new is coming in SEEK kits. As a result of a survival kit conference at the Aerospace Crew Equipment Department toward the end of January, Naval Air Systems Command has requested ACED to prepare 1) a revised specification for a new survival kit, 2) an instructional booklet on usage of kit items and 3) a technical directive on procedures for replacement of expired drugs and damaged or lost items. One of the concepts discussed was a 24-hour survival kit with room for additional items so that area commanders can tailor the basic kit to their local needs. APPROACH will keep its readers informed on developments. In the meantime, here is a pair of articles on the current kit. One is by LCDR Talvaris Turaids, MC, who also authored the comprehensive article "Medical Aspects of Survival in Southeast Asia," APPROACH January 1968. The other is by PR1 Stanley G. Crowley, survival instructor with the FAETULant Mobile Survival Training Group. (Please see "Road Show," APPROACH March 1969.)

Stretching Your SEEK Kit

By PR1 Stanley G. Crowley,
FAETULant Mobile Survival
Training Group

MOST of us are vaguely familiar with all the items in our two-part SEEK-2 kit. In commands where the policy is not to open the kit until in an actual survival situation (to prevent damage, pilferage or loss), training programs can take the place of first-hand knowledge. The January 1968 APPROACH centerspread provided an excellent reference on the kit.

There's one important component of the kit, however, which you won't find in any list and it's a real kit-stretcher. Call it what you like – it's a combination of good old American ingenuity and large doses of imagination. Let's take a look at some imaginative unorthodox uses of the SEEK-2 kit items. You, yourself, can probably come up with some we haven't included.

First of all, there's a wealth of water and survival food containers in the kit's packaging. The large green plastic carrying bags which hold the two parts of the kit make excellent canteens especially for the land survivor since the bags have belt loops incorporated. Some commands require that the kits remain packaged in the clear polyethylene wrappers as received from supply. These, also, despite the pressure relief holes near the top, can be used as water storage bags. You can seal off the pressure holes from the inside with the bandaids in your kit.

Breaking into the components of the kit, let's consider the small squeeze bottle of liquid surgical soap and the little bar of Dial, both intended for use to combat infection. You can coat your hands with these agents prior to skinning game if you have cause to suspect the presence of tularemia or rabbit fever in the animal. Remember, however, that the troops in the black pajamas have been known to home in on cosmetic odors so exercise caution using the Dial.

Take a second look at such items as the sun and bug ointment, the bacitracin opthalmic ointment, the

Seek to Know your SEEK

By LCDR Talvaris Turaids, MC,
Attack Carrier Air Wing 21 (CVW-21)

ARE YOU familiar with the contents of your SEEK-2 kit? Knowledge of the functions and uses of the medical items contained may someday save your life. As with any survival material, such information is best acquired *before* you find yourself in a life-threatening situation.

Here are the intended uses of these items.

Alertness tablets (Dexedrine-dextroamphetamine sulfate): This drug is an energizer useful in combating fatigue and preventing sleep. It stimulates the brain and thus increases mental alertness, restores optimism, gives a feeling of energy and well-being and causes a striking improvement in performance when the latter has been reduced by fatigue. Use only in an escape and evasion situation where you have to remain alert and keep going. They may be used for up to 48 hours but the fatigue prevented will eventually catch up with you causing a tremendous slump with drowsiness, lethargy, depression and weakness. Take one tablet every four to six hours.

Antiseptic ointment (Bacitracin and Neomycin): Very effective against a wide range of bacteria. Used for prevention or eradication of infection in minor cuts, wounds, abrasions, burns, boils, insect bites or skin rashes. Apply lightly two or three times daily. Not recommended for use in the eye as a serious adverse reaction may result.

Aspirin (Acetylsalicylic acid – ASA): The main actions of ASA are antipyretic (lowers body temperature when elevated) and analgesic (alleviates pain). It is especially effective in relieving pain of low intensity (headache, sunburn, muscle and joint pains). Also effective in various kinds of inflammation – colds, sore throat, rheumatism or gout. Take two tablets every four hours. Applied locally to the skin (as a paste of one to two tablets and the sun and bug repellent ointment or ground into animal fat), it has a counterirritant (anti-itch) effect. Dissolved in hot water it may be used

bacitracin anti-infection ointment and the chapstick. All these have a vaseline base and can serve as lubricants, rust preventives, fire-building aids and a base for retaining facial camouflage. Smeared on the body of an attached tick, these lubricants will cut off its air supply and cause it to back out. You can lubricate your weapons with these items but remember, don't do this in cold-weather areas. When temperatures are low enough to stiffen the chapstick it can be used as a candle – all you need is a cotton wick.

There are two squeeze bottles of insect repellent – the old standard stuff and a leech repellent. The old standard has been referred to as instant feather stick and it does make an excellent fire starter. As you probably know, tobacco also makes a good leech repellent. The contents of one cigarette in a bloused trouser leg will help repel boarders in swampy, leech-infested areas.

Now for a couple of miscellaneous items . . . salt tablets and bandaids. The sea survivor has no need for the salt tablet and the land survivor can use it for flavoring his meals, thereby receiving his needed salt and improving the taste of his food. A wet salt tablet touched to the head of a leech will cause it to fall away. The bandaids in your kit can be used as adhesive tape as well as patching material. They also, of course, make excellent buffers to prevent foot blisters.

The matches provided in the SEEK-2 kit are a last resort device for starting a fire. The synthetic flint stick should be used first as it will last much longer and is good for thousands of starts. Tinder in the form of absorbent cotton and wax-impregnated paper is provided in the kit. Spreading and fluffing the cotton to set up a good air-material ratio will cause it to take a spark and burst into flame readily. The starters work equally well on any dry, fine combustible material. All starters operate best when struck with a serrated edge. The kit provides a combination blade-hacksaw on one side and regular cutting edge on the other. The serrated hacksaw edge is great for sparking. Using your Mk-79 pencil flare gun as a handle, the hacksaw blade is also excellent for slicing into bamboo as opposed to using the standard Navy survival knife.

The most versatile and comprehensive item in the kit is that which is listed as a waterproof receptacle. For the purpose of discussion, we'll refer to it as "the device." First off, it is a sterile water receptacle; by placing it in a sock or an improvised sack you can eliminate its instability.

The device can also be used to keep anything dry. It

for throat gargle.

Anti-diarrhea tablets (Lomotil): Inhibit excessive motility (irritability) of the stomach and intestines and are useful in the treatment of diarrhea from various causes such as infections or food poisoning but will not relieve pain. Take two tablets three or four times daily.

Eye ointment (Bacitracin ophthalmic ointment): Used successfully in the treatment of many external eye infections – conjunctivitis (pink eye), trachoma, inflammation of lids and styes. Most conditions respond favorably to two to three applications daily. May also be used anywhere on the skin.

Fungicidal powder (Desenex): Effective for "athlete's foot" and ringworn if used liberally over a prolonged period. If your flight surgeon has it available, a liquid called "Tinactin" may also be added to the kit for this use. It comes in a 10cc plastic squeeze bottle and will last for a long time since one drop is sufficient for an area as large as the hand. Apply twice daily.

Anti-infection (antibiotic) tablets – Terramycin (oxytetracycline): A "broad spectrum" antibiotic, i.e., effective in a wide variety of infections including pneumonia, cellulitis, kidney infection, dysentery, eye and ear infections and many others. Do not take prophylactically (to prevent infection), except for large, contaminated wounds (compound fractures, third degree burns) where infection is bound to develop. Thus, don't take them for colds, scratches, insect bites or minor localized skin infections. Dosage is one tablet four times daily. Once started, continue taking the drug for at least one week, even if you feel quite well after a few days. For severe infections take two tablets four times daily for the first three days. (The number of tablets supplied in the SEEK-2 kit is insufficient and should be doubled by the addition of extra tablets obtainable from your flight surgeon.)

Insect repellent, sun and bug ointment, leech repellent: Insects constitute the greatest hazard in jungle survival. Many are disease carriers; also, insect and leech bites frequently result in severe secondary infections. Apply to all exposed parts of the body. Use the mosquito head net and nylon mittens in Packet 2 of your SEEK kit especially at dawn and dusk.

Iodine water purification tablets (in Packet 2): Add two or three tablets per quart of water to render it safe for drinking (wait 30 minutes). The water should be as clear as possible; strain it through parachute silk to remove particulate matter.

Lipstick (Chapstick): A useful general purpose

is made of natural rubber and will stretch and give to phenomenal proportions. Articles you might want to protect are your wristwatch, compass, weapon, maps, tinder material or anything else that might be subject to the effects of the elements.

The device makes a good food container and also a refuse container. In a raft at sea it can be used to hold garbage, vomitus or anything which could serve as shark lure when dumped over the side indiscriminately. The device can also be used to cover a bandage or wound that would be better off kept dry. With the reinforced ring and the end cut off, it can be used as a drain for a deep wound that needs suturing.

When fishing in ponds, blow the device into a balloon. With a good length of line tied into the dorsal of your first catch, you then place the fish back into the water in the hope that it will return to its shipmates and you'll have a surface indicator to tell where they are. You can also stretch the device out full length, tie it to the ends of a forked stick for a slingshot or wrap it around your lower leg to blouse your trousers for protection against insects and other crawling creatures. The device can, if necessary, serve as an emergency flotation aid.

When traveling in snow country fill the device with snow and add a water purification tablet. Just before starting your trek hang it inside your clothing in the chest area. Your body heat will melt the snow and provide you with a drink at the breaks.

There are usually only two devices packed in the kits. It is recommended that you carry at least six.

One item that is no longer packaged in the personal survival kits is toilet tissue and leaves are not the answer. This is where that small sponge or chamois cloth comes in mighty handy. Both can be washed clean and used over and over again.

When you utilize your candle get something under it to catch the drippings – they can always be reformed into a new candle. For concentrated heat place the candle in a small hole about the diameter of your fist and at least as deep as the candle. Leave side vents for a draft feed and use your aluminum foil as a custom-fitted container over the hole.

That very sharp arrowhead is best employed as a fishing spear – use the slots in the head to lash it securely to its carriage. How does one aim at a fish in water? The practical answer is to stick the spear into the water and check the angle of refraction. Aiming at a point 35 to 40 degrees beneath the fish will usually do the job. And here's a tip, though it doesn't come under

lubricant. Apply to chapped lips, blisters, tender spots on feet and burns.

Anti-malaria tablets (chloroquine-primaquine): Since there is no effective shot which may be given to protect from malaria, these tablets may be the most valuable drug you have. Make every effort to save them. Take one tablet each week to prevent malaria. Do not chew the tablets as they will stain teeth.

Anti-motion sickness tablets (Meclizine): Effective against sea sickness (in a life raft situation) but not very useful for nausea and vomiting from most other causes. Take one tablet every 12 hours.

Salt tablets: A necessary item for persons not acclimated to a hot climate. Take at least two tablets daily; more may be required with the presence of diarrhea or excessive perspiration. Crushed salt tablets may be used to sprinkle over food to make it more palatable, gargled in hot water for sore throats or applied to leeches to facilitate removal.

Soap (bar of Dial soap found in Packet 2 and liquid Phisohex antibacterial soap): Use sparingly and do not waste it. In tropical climates, moisture, heat and less-than-ideal hygiene combine to encourage infection in the most minor of wounds. Hence, it is most important to clean and dress even the smallest scratch, cut or insect bit.

Razor knife: Useful in opening boils, trimming dead skin and flesh from wounds or removing imbedded thorns and tick heads. It is suggested that you add two No. 11 scapel blades to your survival kit. These small, pointed, razor-sharp blades will be even more effective for the uses described above. They may be sterilized in a flame. ◄

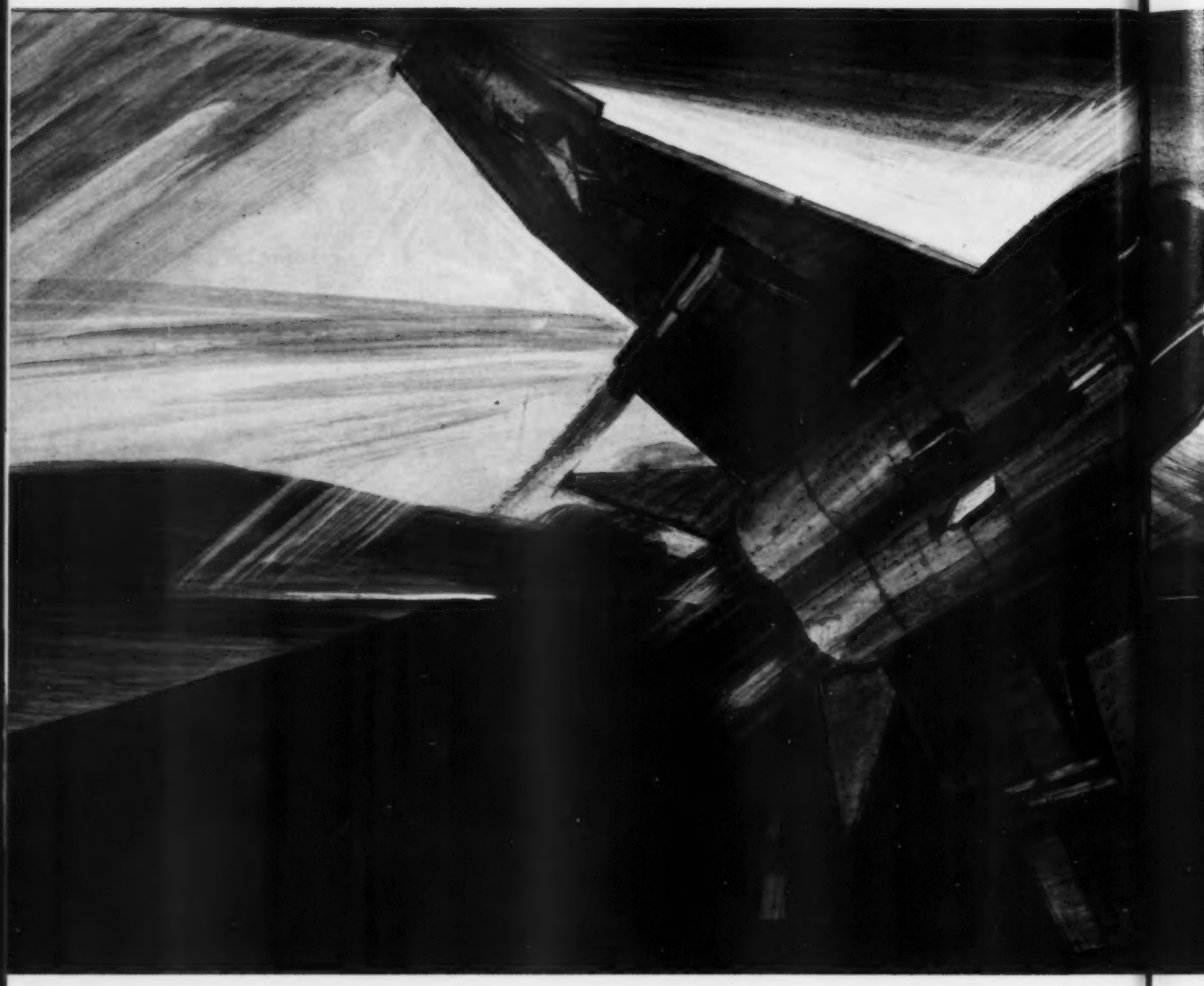
the category of imagination, about using the wire saw. Keep it stretched tightly between two points, don't wrap it around the material you intend to cut. Keeping it straight will save you time and labor and should prevent the possibility of the saw breaking.

What can you do with the water purification tablets beside purify water? Held at the head of a leech the tablet, which contains iodine, will cause it to drop away. The tablet also provides an excellent camouflage dye. Mix it with a small amount of water in the palm of your hand. It is rather difficult to remove this dye, however, and it should only be used as a last resort in an absolute necessity.

Those Charms candies, besides being a food source, can also serve as bait for ants and other insects which will accumulate in large numbers and can provide you with a tasty meal when toasted. Except for the consistency you might mistake them for almonds.

The insect headnet and mittens have a number of uses. Incidentally, when the headnet is used as intended it needs something like wire or a thin sapling as a support to keep it away from your face. Without support it's like non-skid on a flight deck – it gives the bug a toehold while he zaps you. The net can be used when gathering insects for food and can also be used to drown them. It's great for gathering honey and works well as a seine for shiners and minnows. The net gloves and headpiece in combination, being black, serve also as an aid to good camouflage. You can even secure foliage to the net surface.

These few suggestions by no means encompass the fullest extent of usage of items in your SEEK-2 kit. The limits of your equipment are restricted only by the limits of your imagination. Put it to work! ◄



STACKED DECK

THE WEATHER at time of takeoff could not rightly be described as really bad; it was 2500 ft broken, 4000 ft overcast with 7 miles visibility in light rain. Nevertheless, this meant a night actual instrument climbout for the RF-4B, which was cleared to FL 350 on a scheduled radar mission.

A successful climbout under these conditions must have seemed to be a perfectly reasonable endeavor to the highly experienced pilot; however, approximately four minutes after takeoff the aircraft crashed into a mountainside at a steep angle and at an estimated 500 kts airspeed.

What happened during these four minutes of flight? What caused a *normal flight* to end in disaster? The complete answer is not known but information provided by the ARO (Airborne Reconnaissance Officer) (who was ordered by the pilot to eject during the short flight) indicates that it may have been due, in part, to a little bit of a lot of things:

- A little bit of weather.
- A little bit of darkness.
- A little bit of complacency.
- A little bit of a departure from standard squadron procedures.

Any of these factors could probably have been overcome by the pilot with ease, *except* that a malfunction of the inertial navigation system caused a failure of the pilot's primary attitude indicator, creating an emergency situation with which the pilot was unable to cope – hampered as he was with a *little bit of a lot of things.*

Interviews with the ARO indicate that after takeoff, the aircraft remained in afterburner longer than normal (he does not remember the afterburners being deselected). This (the pilot's apparent election to make an afterburner climb) was a departure from squadron procedure for the existing flight conditions.

The ARO further stated that at about 15,000 ft the INS (inertial navigation system) OUT light illuminated. The INS furnishes electrical power to the pilot's primary attitude indicator; however, the pilot's standby attitude indicator is not affected by such a failure. Nevertheless, it does necessitate a transition by the pilot from the big primary attitude indicator to the small (2-inch diameter) standby indicator. It seems likely that this transition was severely complicated by the high pitch angle of the aircraft which resulted from the afterburner climb. Under these conditions, recognition of bank angles is difficult. The net result under night actual instrument conditions is bound to be very disorienting.

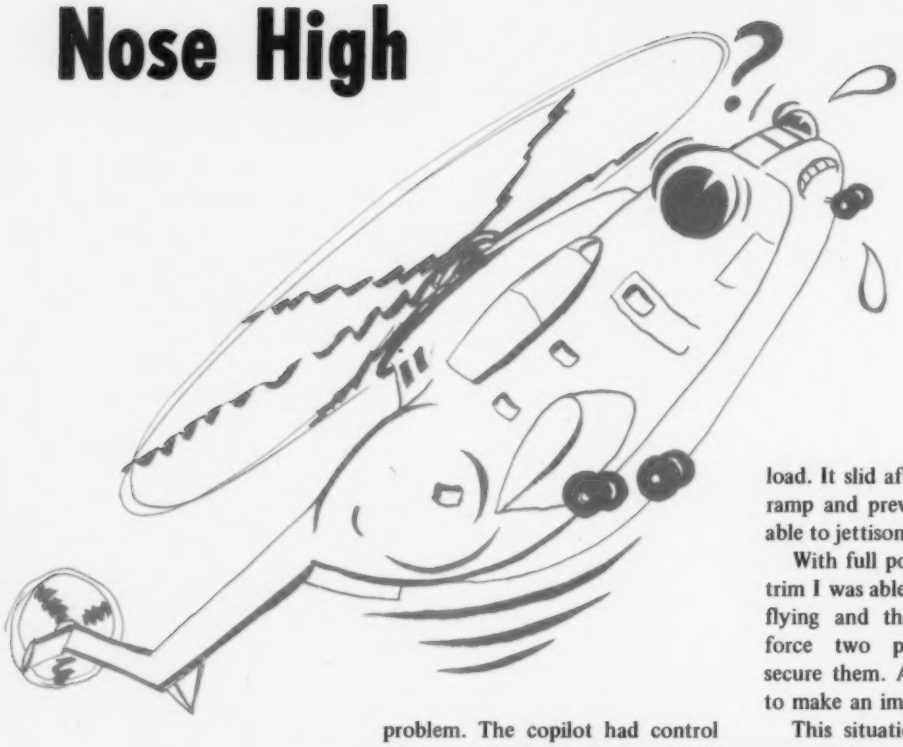
Subsequent to the failure of the attitude indicator, the ARO noted the aircraft to be at FL 240, extremely nose high and at 150 KIAS. Shortly thereafter, the aircraft's nose fell through (apparently stalled) and the airspeed began to build up with the aircraft in a right-wing-down dive. At about 15,000 ft, the pilot ordered the ARO to eject. At the time of this order the ARO could tell from the tone of the pilot's voice that he knew he had a problem but there was no indication of extreme anxiety or excitement.

After the ARO's ejection, the aircraft apparently continued out of effective control until it hit the ground. The pilot made no attempt to eject.

The importance (or hazard) of the failure of the attitude indicator as a cause factor in this accident should not be minimized. On the contrary, it serves to emphasize the need to take all possible precautions in order to guard against hazards such as weather and material failure/malfunction, which are beyond the control of the pilot. In this case, the pilot's decision to make an afterburner climb in night actual instrument conditions (in violation of squadron policy) may have been the critical factor which stacked the deck against him.

If the deck is to be stacked, let's stack it in favor of the pilot by alertness, careful planning and compliance with established procedures. ◄

Nose High



ON MY second hop as Helicopter Aircraft Commander (HAC) in the CH-53A we were handling internal cargo from Da Nang to another base. The first two loads were handled with no problem. The copilot had control of the aircraft for the third lift. Loading and liftoff were normal. Shortly after liftoff I felt the nose of the helicopter pitch up and the copilot started to compensate for it. I took control of the aircraft as the nose of the helicopter pitched up violently and the aircraft started to settle. We were at 150 ft and flying at 65 kts. I immediately called for full power and full forward cg trim. The crew chief then informed me that the 7000 lb load had shifted aft. The tie down chain had snapped and released the load. It slid aft, jammed against the ramp and prevented us from being able to jettison the load.

With full power and full forward trim I was able to keep the chopper flying and the crew managed to force two pallets forward and secure them. After this I was able to make an immediate safe landing.

This situation could have been prevented by adding extra tie downs and by ensuring that the front pallets are secured separately. This will prevent the entire load from shifting aft if the tie down fails.

The C.O.'s comment: The pilot did a good job of handling this emergency created by his crew. All HACs are instructed that crew preformance is their responsibility. Pallets are individually secured now, especially after this crew experienced this hairy ride. The CH-53A needs a cockpit rearview

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

mirror so the pilot can watch cabin activities.

HMW Mouse

• *Wow! The pilot handled this beautifully and the crew responded like pros. Agreed that a mirror would be a handy piece of installed equipment so this good suggestion has been forwarded to NavAirSysCom.*

Operations in the Area of Positive Control

WHILE PROCEEDING on an IFR flight plan at FL 290, ATC informed me of traffic at 12 o'clock, 12 miles. At that time I was in visual contact with another aircraft and had been for the last 10 minutes because it was trailing smoke in its wake. Now, I was slowly closing the distance which separated us.

I approached to within one mile of a transport with rear mounted jets. I noted that it was gradually varying its altitude from approximately FL 310 to FL 280. I had to fly slightly to the left to stay out of its wake and keep it in sight. After about 15 minutes our individual routes caused an opening situation. The weather was VFR at altitude with excellent horizontal visibility. It was obvious from radio traffic that this aircraft was not being painted by radar. I am not sure if it was, in fact, under positive control. With the advent of corporate business aircraft, is it possible that someone would knowingly violate APC for his own benefit? Or would an airliner vary his altitude without informing ATC?

You may not be safe in APC in VFR conditions.

Anymouse

The apparent violation of air traffic rules recounted in this Anymouse has been discussed with the FAA representative at the Naval Safety Center. His comments are enlightening and should be of interest to all readers:

• *"A number of things could be wrong here, e.g., altimeter error in either aircraft, aircraft operating at other than assigned altitude, an erroneous ATC altitude assignment – or someone flagrantly violating APC regulations.*

• *"If the traffic given by ATC was the same aircraft overtaken by Anymouse then ATC should have known the identification and altitude of the aircraft. It should be mentioned that there is no mandatory requirement to give traffic information to aircraft operating in APC; however, controllers frequently do give traffic to separated aircraft as an additional service and in the interest of avoiding a possibility of spatial disorientation.*

• *"Again, if the traffic given was the same aircraft then, obviously, it was held under radar surveillance by the Center. But, another question is raised by this Anymouse: Why would a pilot operating in APC who is aware of another aircraft at his assigned altitude fail to bring it to the attention of the controller or at least get the aircraft's registration number so that the situation could be investigated? The conclusion is that Anymouse has used the wrong reporting method. Now, no remedial action can be taken and this is regrettable because another step could have been taken to improve safety.*

• *"Anymouse is right about one thing, i.e., even in APC the pilot vigilance regulations still apply.*

• *"Finally, I cannot close without addressing the safety record for operations in APC – it has been outstanding."*

The salient point in these comments is that since the situation observed by Anymouse was not reported in a timely and correct manner, along with the observed facts, little can be done to determine why the situation occurred. As indicated in the above comments there are a number of possible explanations but without the facts, all conclusions must be based on conjecture.

Another point needs clarification. Anymouse states: "It was obvious from radio traffic that this aircraft was not being painted by radar." Military aircraft capable of operating in APC are almost invariably controlled on UHF frequencies while civil aircraft use VHF frequencies. Occasionally, controllers will find it pertinent to transmit certain information simultaneously on both UHF and VHF frequencies; however, the military pilot should recognize that

at best he will only be hearing one side of the controller-civil aircraft radio traffic and that he will be completely unaware of many controller-civil aircraft radio exchanges.

Finally, regardless of where you operate – in APC or other airspace – a good visual lookout is required whenever weather conditions permit. And it's good headwork, too. Neither instruments nor people are infallible and it's just possible that a good lookout could save the day – even in APC.

Near Mid-air

UPON returning from a combat mission one morning I entered the VFR holding pattern of my CVA in the vicinity of *Yankee Station*, as a single A-4F aircraft. Maintaining an altitude of 3000 ft and an airspeed of 220 kts for fuel economy, I commenced a gradual, accelerating letdown at Charlie minus six minutes to follow the fighters into the break. While passing an altitude of 2500 ft, I noticed an aircraft in my peripheral vision approaching from my starboard beam position, slightly high, in a slightly banked turn and at high speed. Not knowing if the other pilot held me visually and since his flight path was a descending one, I eased the nose of my aircraft up. Immediately the other aircraft did the same, continuing on a collison course.

Maneuvering of the other aircraft indicated that the pilot was making an intentional high speed run on my aircraft. At what I would estimate as less than one-half mile I became certain that a mid-air collison was more than likely; however, the speed of the approaching aircraft (estimated at 500 kts plus) gave little time for evasive action. I remember thinking that the only thing to do was to, "hold what I have," for I was certain that any maneuver would further guarantee a midair.

The approaching A-4 continued at extremely high speed, passing directly in front of my aircraft, through my flight path, at what appeared to be a distance measurable in inches. This statement is made with no exaggeration for I have been exposed to uncomfortable proximity in air combat maneuvers but this is the closest ever. Unfortunately, the speed of the other aircraft was so great, the proximity so near and the time so brief that I could not discern aircraft markings but *can* definitely state that it was an A-4. To some degree of satisfaction, though, I have determined that it was not from my own squadron.

This apparently deliberate near midair was performed in conditions of low-scattered to broken cloud conditions (.1 to .5 coverage at 1000 ft as reported by meteorology) and directly within the ship's VFR holding pattern. It is beyond probability to assume that the passing aircraft was not on the proper frequency – and did not see other aircraft in the pattern. The pilot, by deliberate action, violated every rule established concerning the operation of aircraft and acted in a manner which is contrary to every effort at every level of command concerning flight safety.

With that 20/20 vision peculiar to hindsight I cannot say why I did not eject. I suspect that had there been another moment or two for reaction (I believe I actually froze in disbelief that such a stunt was being performed) there would now be one less A-4F in the inventory.

It would appear that the efforts of education in aviation safety – and that intangible something referred to as professionalism – continue to escape a few. Deliberate and energetic action by command seems to be the only effective path for solution.

It is unfortunate but, today there is a very careless A-4 pilot somewhere in the fleet who may not deserve the privilege of wearing Navy wings.

Irate Mouse

Your report is disturbing for several reasons. First, it recounts the circumstances of a near mid-air collision which was a close one, indeed. And since mid-air collisions continue to pose such a serious threat to naval aviation safety (see the article on page 12 of this issue), impulsive, unbriefed maneuvers such as the one described have no place in naval aviation and should not be tolerated by on-the-scene commanders. It may be, however, that this incident was an accidental and unavoidable result of many aircraft operating in a small area – and not the result of any intentional "run" or other lack of air discipline. This possibility is suggested because of the fact that the aircraft passed directly in front of Anymouse's aircraft, at close range and at the same altitude. It seems that any aggressor, however unskilled, would have been able to easily avoid this particular hazard.

The fact is, many mid-air collisions have occurred (from almost every angle) without either pilot ever seeing the other aircraft. And, though Anymouse's report leaves little doubt about his view of the circumstances, it certainly seems possible that this near midair could have been accidental.

Nevertheless, whatever the cause of this particular report about lack of air discipline, it cannot be ignored. On-the-scene commanders should take every opportunity to emphasize command support for air discipline.

Helicopter pilots are finally going first class. The Navy Tactical Doctrine Activity (Navy Yard, Washington, D.C.) will publish, in May 1969, a three-ring, loose-leaf handbook called SPLASH (Shipboard Platforms for Landing and Servicing Helicopters).

SPLASH is the name of a new CNO promulgated TacAID (Tactical Airborne Information Document)* prepared by the NavTacDocAct to enhance safe and efficient helicopter operations. The TacAID is designed primarily as an aid for the helicopter pilot operating with nonaviation ships of the Navy and Coast Guard. The first edition contains information on Navy nonaviation combatants and Coast Guard ships and will be distributed in May 1969 to all helicopter squadrons and units and to ships with helicopter facilities.

The TacAID provides a page for each ship, arranged first by type (BB, CA, DLG) and then alphabetically. Each page includes a silhouette and three-quarters view, a platform diagram, a listing of helicopter communication/navigation and service facilities available and the latest certification information. A sample is shown in the centerfold.

The TacAID is not the helicopter pilot's equivalent of the familiar enroute supplement and approach plates. Rather, it is an aid designed to assist the pilot in identification and familiarization with specific ship's characteristics and capabilities. When improved certification criteria for nonaviation ship platforms are promulgated the TacAID will be updated and will become more useful and similar to an enroute supplement. Further changes will include certification data for both landing and vert-rep operations, helicopter platform firefighting capability, types of tiedowns available, fuel pumping rate, type of nozzles and the amount and kind of maintenance service and parts available.

The fact that a platform is shown for a specific ship does not imply that helicopter landing operations are in fact authorized. Operating from helicopter decks of nonaviation ships will continue to be done in accordance with instructions of fleet and type commanders or other applicable directives.

The first edition of SPLASH is designed primarily as a landing aid. The vert-rep platform installed on some ships, and any special vert-rep procedures, are not detailed in the first edition. It is planned to include vert-rep data in future editions so that SPLASH will be a useful guide for all helicopter operations. For the present, pilots are cautioned to be cognizant of locally developed vert-rep foul lines painted on some helicopter platforms.

The first edition of the TacAID is compiled from direct correspondence with the ships which are depicted. It means only that the ship has a platform, as shown, and should have the stated aviation equipment aboard. Pilots are cautioned to use the TacAID only as a guide to determine which ships are designed to meet their requirements. Prior to making an approach pilots are responsible to ensure that the ship has, in fact, the capability listed. For example, a nonaviation ship with limited aviation fuel may have depleted its supply in previous refueling operations.

The only certification information shown in the first edition will be for those ships certified in accordance with VLAB 9-2 (Visual Landing Aids General Service Bulletin dated 1 March 1967).+ A new NavMat Instruction 3120 series (Aviation Facilities in Nonaviation Ships, Certification procedures and responsibilities) will, when published, establish new certification procedures. Future editions of SPLASH will include these new certification data as they become available. Certification in accordance with VLAB 9-2, providing no alterations affecting certification are made, will remain valid until the ship's next yard period. Ships not certified may be granted a waiver only by the fleet commander in chief. Pilots should check local files to determine which ships have been granted waivers. If certification information is not available the responsibility of operating from a ship is a case of pilot's and local commander's discretion.

Helicopter pilots are encouraged to submit comments and recommendations for improvement of SPLASH to Naval Tactical Doctrine Activity, Code F1A, Washington Navy Yard, Building 200, Washington, D.C. 20390. If the comments are urgent telephone: Autovon 22-32309/10.

* Not to be confused with the ASW TacAID.

+ Certification information for ships certified in accordance with VLAB 9 and 9-I will not be shown because these bulletins have been canceled. It is noted that certification in accordance with VLAB 9-2 addresses visual landing aids and rotor clearances only. It does not address structural adequacy of the deck.

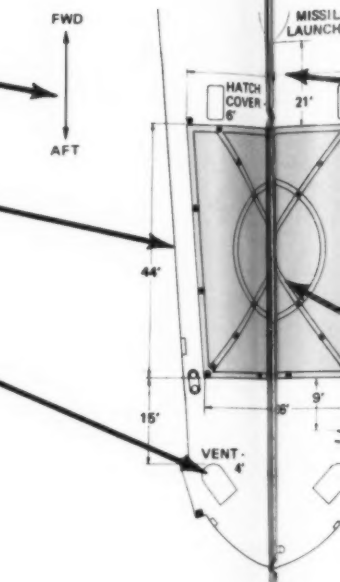
Continued

Sample Page..

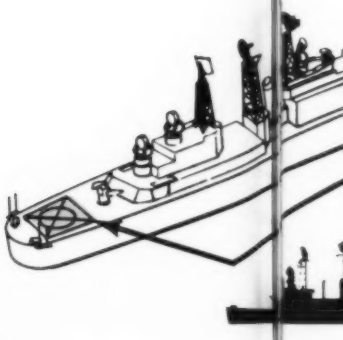
Direction of platform.

Hull line of ship.

Obstructions over 2 ft high shown with height in feet.
Some include distance from platform edge.



Helo starting power with cables.
AC-115/200 V, 3 phase
400 hz, 30 KVA
DC-700 AMPS continuous,
1000 AMPS intermittent
285 V, 45 KW
(Note: CLG-7 does not have D.C. power)



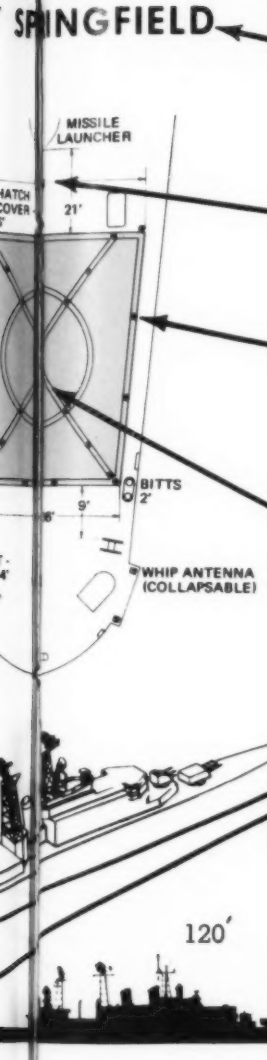
Fuel -
JP5 (Note: This ship does not carry AV gas)
HIFR - Hover inflight refueling
(Type No. 331e not specified)
(Note: CLG-7 does not have HIFR)

FUEL – JP POWER – AC
NAVIGATION – TACAN, UHF/DF
COMMUNICATION – UHF, VHF, HF
HELO DECK HEIGHT ABOVE W.L. – 24'

Communication.

Navigation equipment channel info not given to preclude classification.

..SPLASH



Name of ship and hull number.
Pages arranged first by type and then alphabetically.

Helo platform dimensions

Lights

Red deck edge

White lineup light
(Indicate approach angle)

Green touch down light

Deck flood light

Painted deck markings
Some DLGs may show special yellow lineup markings for H-3s.

Oblique aerial view - showing helo platform position.

Silhouette view, with height of highest mast.

CERTIFICATION –
CERT for NIGHT and DAY LANDING IAW VLA BUL 9-2

The only certification information included will be IAW Visual Landing Aids Bulletin 9-2.

(Coast Guard certification will be listed as max weight and largest helo.)

'Coffee, Tea or Milk?'

THOUGH we rarely conceive of them as such, there is no denying that nicotine from cigarettes, caffeine from coffee, tea and coke, theobromine from cocoa or chocolate and, of course, alcohol from the night before, are all drugs. They have very definite effects on your physiological and mental functions far beyond most people's realization. (The absorbed amount of nicotine from a single pack of cigarettes taken in one dose could have extremely serious effects and combined with caffeine from six to eight cups of coffee would have you crying for a tranquilizer.) Moreover, withdrawal of these drugs, most often involuntarily because of mission requirements, also has a conspicuous effect physiologically but primarily psychologically which can significantly deteriorate performance capabilities.

Those drugs which the majority of us indulge in are generally classed as either stimulants or sedatives. Caffeine, theobromine and nicotine are stimulants and alcohol is a sedative. Alcohol will not be discussed here because its effects physiologically and mentally, the effects of its long term use and its withdrawal, and the complexities of its contraindications in the flying population have been well documented and are generally well known (whether heeded or not) by almost all airmen. *(See "Alcohol and Flying," page 32, May 1968 APPROACH.)*

Caffeine, as a stimulant, is best pictured as the "picker-upper" on arising in the morning. It is more poignantly visualized in its role as a potential safety hazard in its absence when one witnesses the psychological effects of its acute withdrawal in a habituated airman who unwillingly is forced to his aircraft without that first cup. Could you believe that a mild stimulant, as found in one cup of coffee, could have such profound effects? The man drags, he is devoid of enthusiasm, he constantly iterates and reiterates how he "could sure use a cup of coffee." In other words, this man is preoccupied with concerns other than his job. The extremely heavy coffee drinker (15 to 25 cups a day) is far worse and actually is physically and mentally slowed until he has consumed at least several cups. *(See "Coffee, the Ubiquitous Navy Liquid," page 28, February 1964 APPROACH.)*

Coffee, derived from the seeds of *Coffea arabica* contains primarily caffeine. Tea, from the leaves of *thea sinensis* contains caffeine and theophylline. Cocoa, from the seeds of *theobroma cocao* contains caffeine and theobromine. Finally, coke from the *Paullinia* plant, contains large amounts of caffeine.

These drugs – caffeine, theobromine and theophylline – are, chemically, methylated zanthines which have similar pharmacological properties but differ in the intensity of their actions on various structures. Primarily they all stimulate the central nervous system, stimulate the heart muscle, relax certain smooth muscle structures (notably the coronary arteries of the heart and the bronchi of the lungs) and act on the kidneys to produce diuresis (stimulation of urine production). Whereas caffeine has the greatest effects on stimulation of the nervous system and skeletal muscles, theophylline has its most profound effect on smooth muscle relaxation, diuresis and coronary and cardiac stimulation. Theobromine is similar to theophylline but is less potent. All have an effect in constricting peripheral blood vessels, increasing cerebral blood flow, increasing blood pressure, augmenting gastric secretions and generally increasing metabolism. A cup of coffee contains 100 to 150 mg caffeine, as does tea.

All the potential effects of these drugs on flying cannot be dealt with in the space of this article but describing their pharmacological actions should provide many answers for you. Certainly the flier predisposed to ulcer disease or "nervous stomach" or with borderline hypertension should beware of heavy consumption. Certainly those airmen on aircraft without head facilities should heed the significance of the term "diuretic." All should realize the potentialities of these drugs which undoubtedly significantly influence many of their daily activities and may well account for many of their physical and mental symptoms during an ordinary day, as well as affect their crew rest or lack of it. Perhaps most important, once again, is the occasionally necessitated abstinence from this habit and its profound effects . . . think about it!

Deviating to our other curse, nicotine, we find a similar though perhaps more insidious and more serious problem. *(See "Tell It Like It Is," page 26, December 1968 APPROACH.)* More than two-thirds of our flying population are smokers, most smoke cigarettes and the majority smoke one pack or greater per day.

Other than the effects of the various hydrocarbons on the respiratory mucosa, their relationship to cancer and their deleterious and potentiating effect on numerous diseases, primarily cardiac and respiratory, we are concerned here with the immediate effects of nicotine.

As the foregoing will indicate, it is fortunate that tobacco smokers develop a rather marked tolerance to nicotine but unfortunate that such tolerance is probably of great importance in causing fairly profound symptoms when withdrawal is necessitated. Nicotine is a natural liquid alkaloid from the *nicotiana tabacum* leaf which is pharmacologically classified among the ganglionic blocking agents. It is a highly toxic drug which has no specific therapeutic usage.

Nicotine acts by initially exciting all sympathetic and parasympathetic ganglia with subsequent paralysis of the ganglia, having a similar effect on skeletal muscle and the central nervous system. The primary central nervous system effect is on the respiratory, vasomotor and emetic (nausea) centers of the brain. There is initial stimulation of adrenalin secretion followed by decrease. There is an initial slowing of the heart followed by an increased rate and occasionally abnormal rhythm with large doses. Peripheral blood vessel constriction causes elevated blood pressure and coldness of the extremities. There is stimulation of intestinal activity with occasional diarrhea and nausea initially, followed by inhibition. Numerous minor effects are present as well, not including the effect of the smoke itself.

What does this mean to the smoker who, as stated, develops considerable tolerance? Consider that a person smoking 20 cigarettes in a day will absorb 58 mg of nicotine or 3 mg per cigarette. The fatal dose of nicotine in the adult is 60 mg and 4 mg will produce severe symptoms in the nonhabituated individual.

Two facts are alarmingly apparent. First, we are dealing with a markedly potent chemical agent and second, the "smokers" have developed an alarming tolerance. The smoker well knows when he has smoked too much and is also well aware of the "nicotine fit" after withdrawal. Are not these drug effects quite capable of interfering with the stability of a presumably alert airman? And what effect will they have in an emergency situation? Can the pilot who is forced into abstinence for several hours or more function clearly when he has a recurring "need" for a cigarette?

Think about it!

Excerpted from "Little Known Drugs"
by Major J. H. Cohn, MC, USAF
Aerospace Safety Magazine, June, 1968

Fatigue

FATIGUE was a contributing factor in a pilot-factor, midair collision of two A-4Es over the ship at the end of a combat mission. Both aircraft were recovered aboard. Both pilots had been working continuously for the preceding 12 days under extreme pressure. (One pilot had briefed and flown 14 combat missions, briefed and manned an aircraft for eight spares and spent one day as squadron duty officer. The other had briefed and flown 15 combat missions, briefed and manned an aircraft for seven spares and spent a day as duty officer.)

In their final recommendations, investigators made the following comments: "While the factors that may induce pilot fatigue are fairly well known, there is no readily available way of determining the boundary level at which a pilot is judged to be unduly fatigued and thus unsafe to fly. This level will vary between individuals and is difficult for an outside observer to discern since it can be easily disguised by a highly motivated and competitive pilot. Common sense dictates that each aviator admit when that point has been reached. All too often personal pride will prevent him from doing so, especially in a combat environment. To ask to be left off the flight schedule because of fatigue leads one to feel he is either shirking his duty or is causing his 'buddy' to be unduly exposed to danger in his place. As a result, pilots are extremely hesitant to admit to fatigue and will not do so as long as combat operations dictate the flight requirements. To

notes from your flight surgeon

aid in alleviating the fatigue aspect it is therefore recommended that:

"1. Regular stand-downs from heavy combat flight operations be scheduled and that such stand-downs occur once weekly and be of 24 hours' duration.

"2. All pilots be encouraged to admit to fatigue when their personal level has been reached.

"3. A program be instituted within the squadron to relieve pilots of flying and normal ground duties for 24-hour rest periods during prolonged (eight or more days) combat operations when stand-downs are not possible."

Though pilot fatigue is often indefinable, typical indications of it are marked delay in an individual's ability to react promptly and correctly to any situation.

"It is evident," investigators stated, "that neither pilot reacted to the best of his normal ability or with the proper speed."

Immediately after the accident, steps were taken to alleviate the fatigue factor by adjusting the flight schedule to permit four of the 24 pilots assigned to have a non-flying day every day, the squadron C.O. reported. The number of daily sorties was such that each pilot was thus assured a day of rest every fifth day without materially increasing the load on the remaining pilots.

The final endorser supported the recommendation to schedule regular stand-down days when in a combat environment.

Risky Practice

FOLLOWING ejection, an A-7B pilot reported that the rough seas enabled him to determine his height above the water so he released his koch fittings 2 to 4 ft above the surface.

"I cannot argue with the success in this case," the investigating flight surgeon states, "but I consider this a very risky practice at best. Due to the lack of clues for depth perception, most of the time it is extremely difficult and at times practically impossible to judge height above water. Therefore, no attempt should be made to release from the parachute prior to actually contacting the water."

Safety Center comment: A recent evaluation of the technique of releasing parachute fittings before feet-in-water, carried out by the Naval Aerospace Recovery Facility, El Centro, confirms the flight surgeon's opinion. For a complete report on the El Centro evaluation, please see "Parachute Release Techniques," page 46, this issue.

Foot Save

THE METAL TOE of a plane captain's safety shoe saved his foot from serious injury as a result of a ground incident. The pilot was starting the left engine of an F-4J when the air hose from the starting unit parted, flailed, struck the plane captain's foot and fractured two small bones. The incident report states the primary cause of this occurrence was supervisory in that the required safety wire connecting two hose lengths together was not installed. The application of pressure to the flexible duct assembly while personnel were working beneath the aircraft and the injured man's presence beneath the aircraft were violations of squadron safety procedures.

"The value of safety shoes was proven in this mishap as the initial blow was absorbed by the metal toe," the report states. "Had this man not been wearing safety shoes his injury could have been more serious."

Eye Cover

WHILE climbing through 1500 ft after an afterburner takeoff, an F-4J lost its canopy although the canopy lever was in the locked position. The pilot immediately returned to the field.

"It is significant to note that the pilot was wearing his helmet visor down during the takeoff," the squadron C.O. wrote in his report. "This assisted him in maintaining adequate vision and provided eye protection against cockpit debris after loss of the canopy. The importance of eye cover during all flights is being continuously stressed in this squadron."

Strikes Head

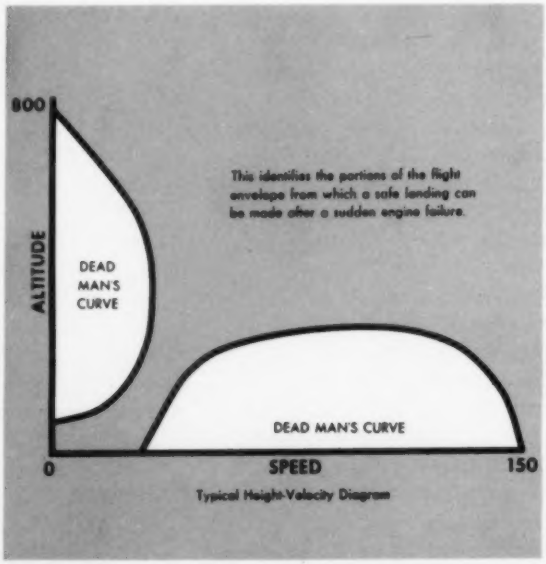
THE PLANE captain of an SP-2H which made an anticipated wheels-up landing struck his head hard on the overhead panel in his egress. He was uninjured. Afterwards he said he definitely felt that the hardhat had prevented a possible serious injury or unconsciousness. ◄

Pointy Horns

By LCDR Jim Gilstrap

None of the information in this article is directed at a specific helicopter currently in operation. The article is intended solely as amplification of the concepts of the height-velocity diagram and certain transitional problems in the autorotation entry. In no case should the information be construed as conflicting with current NATOPS material. – Author

WHEN I first heard the term, "the dead man's curve," I naturally associated it with some point on the State Road Department's real estate where too many speeders left the road. When some right thinking public relations type finally discarded that term in favor of a more professional sounding figure of speech – the height-velocity diagram – it no longer stirred the soul-embers of our adventurous rotor-head cadre. We simply settled down to a frank consideration of a red, green and amber chart; plotting Yes, No and Maybe, regarding anyone's potential success in handling an engine failure in the conditions of altitude and airspeed therein depicted. As you probably already know it isn't really so simple as all that. If we were to have elaborated for us all variables affecting the accuracy of that chart.


800
ALTITUDE
DEAD MAN'S CURVE
This identifies the portions of the flight envelope from which a safe landing can be made after a sudden engine failure.
DEAD MAN'S CURVE
0
SPEED
150
Typical Height-Velocity Diagram

we'd have a book full. Instead, we apply a series of "P" (pucker) factors, number of kids and the amount of the insurance estate.

It seems a pretty fair possibility that some of these "P" factors might be discussed to our mutual advantage – at least for the benefit and consolation of the copilot who struggles to keep his mouth shut and his hands off in a hairy approach. The H-V diagram tells a pilot, in pretty general terms, at which of the combinations of airspeed and altitude engine failure will likely result in an accident. Obviously the lines separating the danger zones from the safe zone must be considered fairly broad because of the many variable factors such as weight and density altitude but the whole thing changes character for descents and for climbs.

As you may remember, the transition to autorotation requires the completion of three specific steps: (1) lower collective; (2) establish descent; (3) stabilize autorotation Nr.* Any progress in the direction of these three steps is beneficial. Therefore the descending helo should be represented by a smaller danger area in the H-V diagram while the climbing helo should be represented by a larger danger area. There are several things the ardent aviator should remember regarding the specific validity of the H-V diagram and its limitations. It represents only test conditions that are cited on the chart as to aircraft weight, ambient conditions, rotor speed and time delay before lowering the collective. Further it represents throttle chops from normal straight and level flight and from hovers over a prepared landing surface. Any difference in the conditions represents a variable not covered by the chart.

In helicopters powered by turbine engines one of the biggest problems is in recognizing the power loss so that some action might be initiated. The turbine inlet temperature, the Ng (gas generator), the Nr (rotor rpm) and the torque gage are, of course, the indicators with the real skinny on what's happening but those instincts cultivated by experience will soon tell you "Hey hot-rock! Yeah, you with the naturally curly hair! If you don't soon lower the collective you will no doubt be up here with no visible means of support." It's the length of that message that accounts for the military specifications stipulating that a one or two second delay time be employed in lowering the collective in the flight test work that establishes the shape of the H-V diagram. However, in descents the message might do the full bit with "please" and a few expletives for emphasis. If you happen to be climbing at the time, the message should be cryptic, terse and to the point – something like "Drop it, Rock!" The descent, of course, represents a flight regime that is very close to autorotation, therefore involving a smaller transition. If a power loss occurs in a climb, you might recall that all that upward velocity has got to stop and the descent be firmly established before the first vestige of autorotational force is created in the rotor disc. This generally leaves your rotary wings up there swatting bugs on their own for quite a spell before they get any help while all those parasites drag down the Nr (parasite drag no less).

Seein' as how the autorotation can't begin with its own name tag until there is a flow of the free stream air from under the rotor disc, it is generally a good procedure to nose up a tad as collective is lowered just to help things along immediately after the power loss. Don't worry about the low airspeed that might result. You can always get that back if you have far enough to go – and if you don't you've got to get slowed down to land anyway. One further benefit to nosing up a little would be to minimize the retreating blade angle of attack which might otherwise threaten life and limb, particularly in high-speed flight. This high speed regime is a tough nut to crack because as most rotor-heads know there have been some disastrous results from total power loss there. You're sorta caught between the rock and the hard place. If you don't lower the collective post-haste, the rotor system stalls and it's Katy-bar-the-door. If you slam it to the bottom in that first movement, the door may have your foot caught in it and cause complete loss of control in some models! Here's why.

While you're charging along at high speed, the rotor is really sucking in the air, much of the velocity of which is generated by the forward speed. If you flatten the pitch on the system in "time zero," the blades feel a negative angle of attack generating, with accompanying negative G, great bunches of negative lift – enough to drive the blades through your place of business, or the tail cone – or both. Something like this could mar an otherwise perfect day.

In order to blunt the pointy horns of this dilemma you must take immediate action to lower the collective as specified by the contractor's recommendations in the NATOPS manual for your model. If this doesn't work, present the collective pitch lever from the broken helicopter to the nearest purveyor of the machine to which you had strapped yourself with such careless abandon. He'll probably treat you to a free steak dinner! There's one thing you can be sure of in this uncertain business of ours – if the propulsive power poops in your parasite popper, your position precariates in positive proportion to the impropriety of the procedures and precautions you pursue – or – the real risk in rooking the reaper rests in not rallying to the rules regarding the restoration of rotor revs. Rots o' ruck!

* Rotor speed

USN Emergency Field

Arresting Gear

THERE is a wide variety of emergency field arresting gear in use at U.S. military airfields throughout the world. In fact, there are so many types (or combinations of types) that the average pilot may be hard-pressed to properly evaluate the capabilities of the gear available, particularly when operating into or out of strange fields. Moreover, what may be essentially the same type of arresting gear will have one Navy designation and another Air Force designation. To clarify this matter, Chart 1, at the end of this article, has been prepared to relate various Navy designations to the Air Force designations. While Navy and Air Force gear *may* be identical, this chart should be taken to indicate only that they are *roughly equivalent.*

Arresting Gear – A Valuable Aid

The value of emergency field arresting gear in preventing or minimizing accidents at U.S. Navy installations can hardly be overestimated. During 1967, for example, there was a total of 2621 recorded emergency arrestments. These included an aircraft with a gross weight of 78,000 lbs which was arrested at a speed of 120 kts and an aircraft at a gross weight of 34,000 lbs arrested at a speed of 180 kts. The tabulation below provides additional information on the overall U.S. Navy emergency field arresting gear experience.

This tabulation shows that certain types of gear receive far greater use than others. We have, therefore, arranged our discussion of the various types of USN emergency field arresting gear according to the order of usage indicated below. It should be noted that several of the types of gear listed are now installed at only a few places and are in the process of being phased out of service.

Another point to be noted is that while various references are made in this article to the arresting capabilites of arresting gear, these references are for the purpose of illustration only. They should not be relied upon for determination of the weight/speed combinations at which engagements can be made in actual situations. To determine this information, you should consult the pertinent ARB (Aircraft Recovery Bulletin) for the type gear involved (refer to Chart 2).

E-15 and E-27 Arresting Gear

These types of emergency arresting gear are designed as landbased emergency standby gear for arresting tailhook equipped aircraft. The arresting engine is a rotary friction-type energy absorber and is designed to

A/G Type	No. Systems Presently Installed	No. of Arrests in 1967
E-15/E-15-1	44*	668
E-28	35**	593
E-5/E-5-1	284*	505
M-2	8*	405
E-14-1	17*	239
E-27/E-27-1	5*	184
E-5/MA-1A	35*	16
E-6	2*	10
E-16	1*	1
M-21	22** †	†

* Indicates number of systems installed is decreasing.

** Indicates number of systems installed is increasing.

† The M-21 originally intended for SATS (short airfield for tactical support) application, has only recently been employed as an emergency system. The majority of systems now installed are for operational use rather than emergency use.

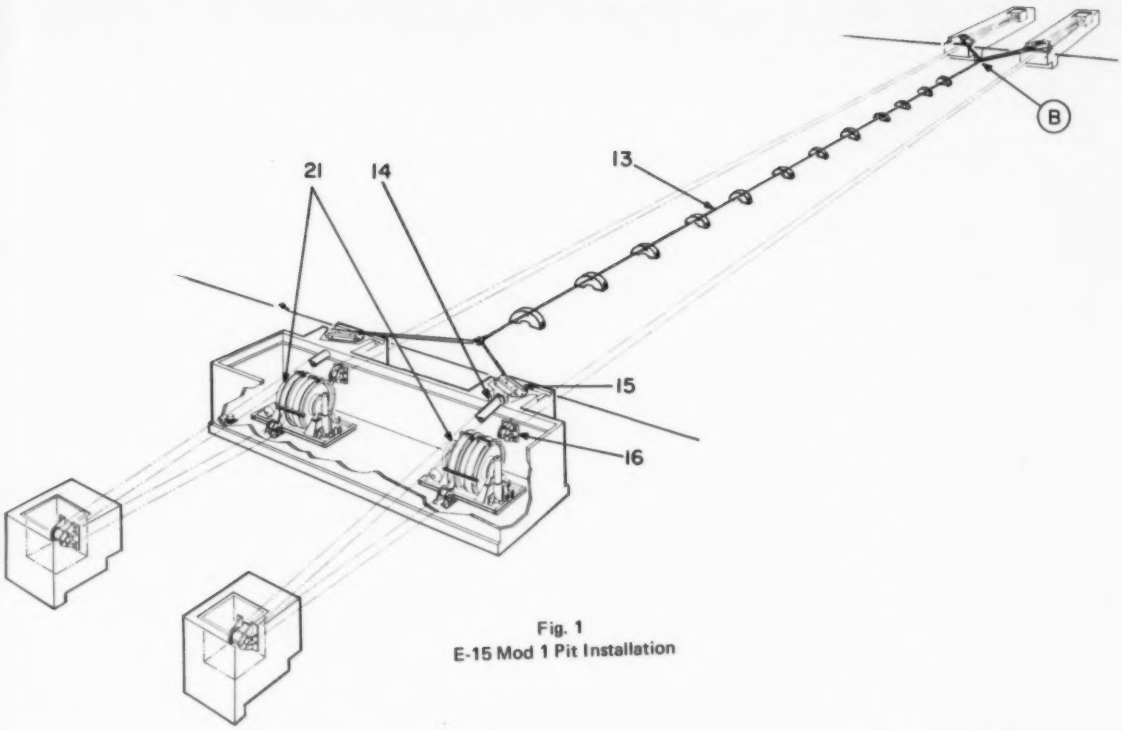


Fig. 1
E-15 Mod 1 Pit Installation

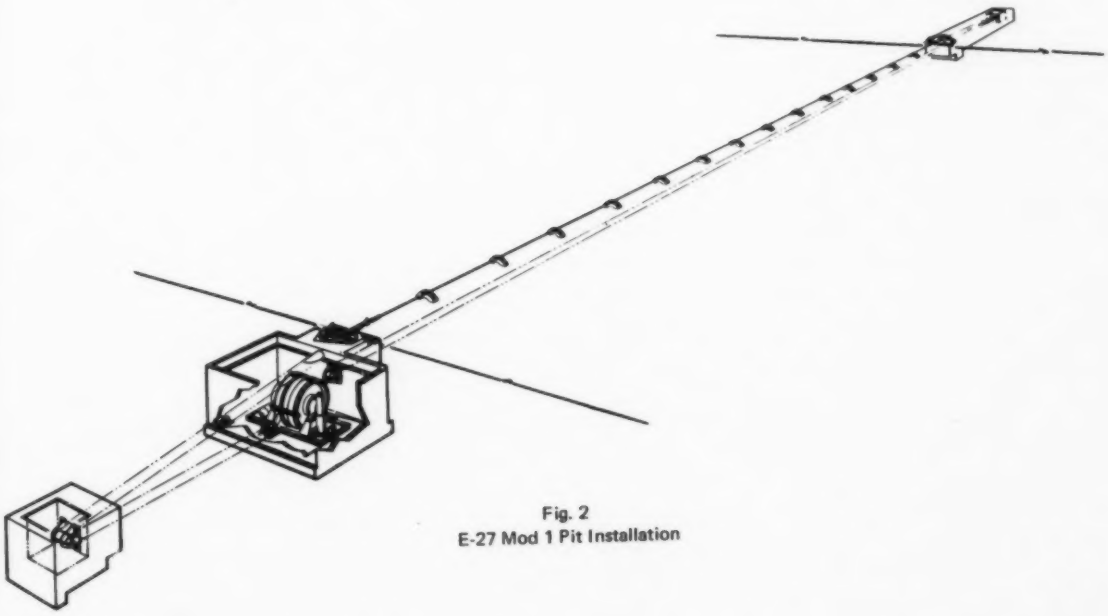


Fig. 2
E-27 Mod 1 Pit Installation

dissipate the energy of a landing aircraft. All types of E-15 and E-27 arresting gear use essentially the same engine for arrestment, although engine components may be changed as necessary to suit individual installation requirements.

Aircraft arrestment is accomplished by the engagement of the aircraft arresting hook with a deck pendant which spans the runway. During runout the kinetic energy of the arrested aircraft is absorbed by the rotary friction arresting engine. The arrestment is entirely automatic. The arresting gear engine is activated when the aircraft arresting hook engages the deck pendant, thereby pulling out the attached purchase tapes. As the tapes unwind the reels rotate, turning sprockets which simultaneously drive a hydraulic pump and rotate a valve cam. The pump supplies pressure to the friction brakes and the amount of pressure supplied is programmed by the amount of restriction in a cam-controlled valve. The brake application decreases the rotational speed of the reels thereby slowing down the purchase tape payout which in turn applies a braking force on the aircraft.

Arresting engines for both the E-15 and E-27 may be installed above or below ground (in a pit). Typical E-15 and E-27 installations are illustrated in figures 1 and 2.

E-28 Arresting Gear

The E-28 is a bidirectional emergency recovery system capable of arresting aircraft ranging up to 78,000 lbs in weight with engaging speeds up to 160 kts. The newest USN system currently available, the E-28 is configured with twin energy absorbers, one on each side of the runway. Each absorber includes a fully wound drum of nylon purchase tape, the free end of which is connected to a wire rope pendant that is stretched across the runway. A typical E-28 installation is shown in figure 3.

During arrestment the pendant is engaged by the tailhook of the aircraft. Forward motion of the aircraft causes the tape to unwind as the energy absorber provides the braking action required for arrestment. Each absorber has a rotor and stator arrangement in a container of hydraulic fluid (water/glycol solution). The rotor converts the rotary motion of the tape drum to fluid motion and then to heat, thereby dissipating the kinetic energy of the aircraft. The heat generated by the arrestment is dissipated through the fluid with the aid of a cooling system. Once the aircraft is stopped and disengaged from the pendant, a gasoline engine powered retrieve system rewinds the tapes, returning the E-28 to battery position.

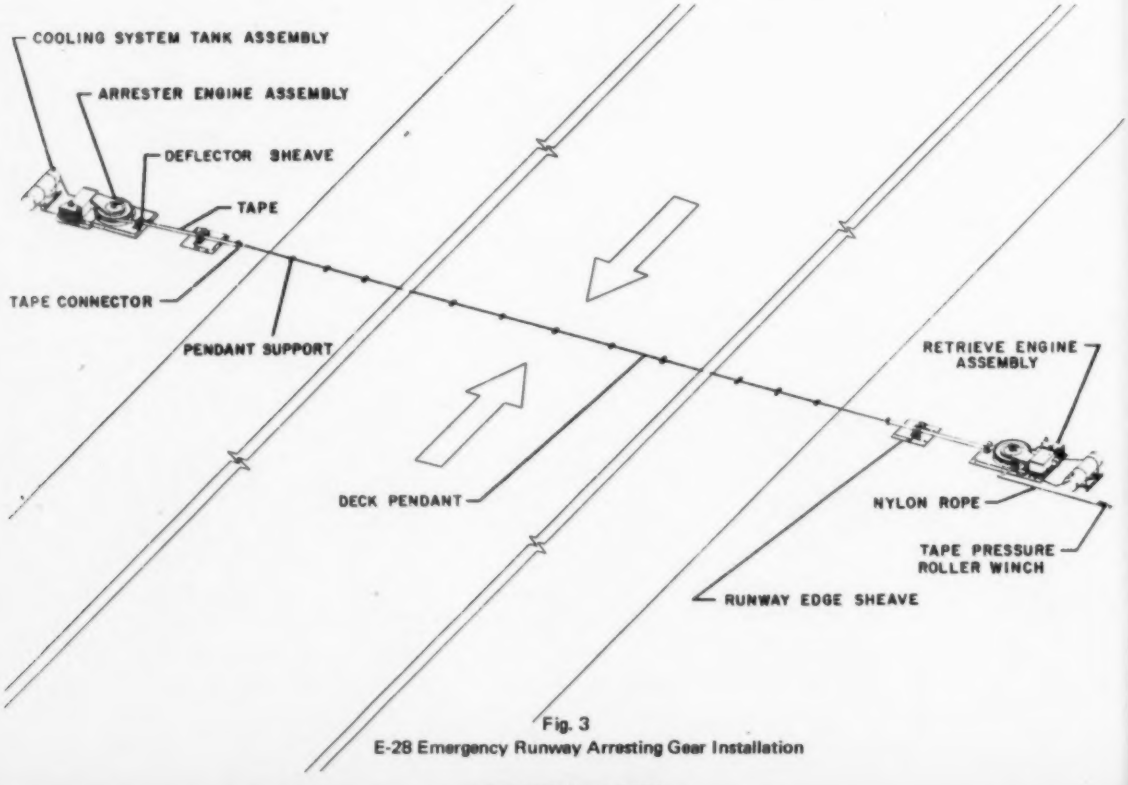


Fig. 3
E-28 Emergency Runway Arresting Gear Installation

E-5/E-5-1 Chain Type Arresting Gear

The E-5 and E-5-1 emergency chain arresting gear equipment consists of dual arresting cable installations which can be rigged for either single or bidirectional arrestments of aircraft (see figures 4, 5 and 6). Bidirectional chain arresting gears are so designed that arresting cables may be attached to either end of the chains. The chain weights are arranged so that the heaviest chain is in the middle. Normally only one pair of cables may be rigged at a time, depending on the desired direction of arrestment.

The E-5 and E-5-1 emergency chain arresting gear usually has two (dual) arresting cables. The difference between the two installations is that the E-5 has a dual "straight" pendant while the E-5-1 has a dual "shaped pendant" (see figures 4 and 5).

The principle of operation for both the E-5 and E-5-1

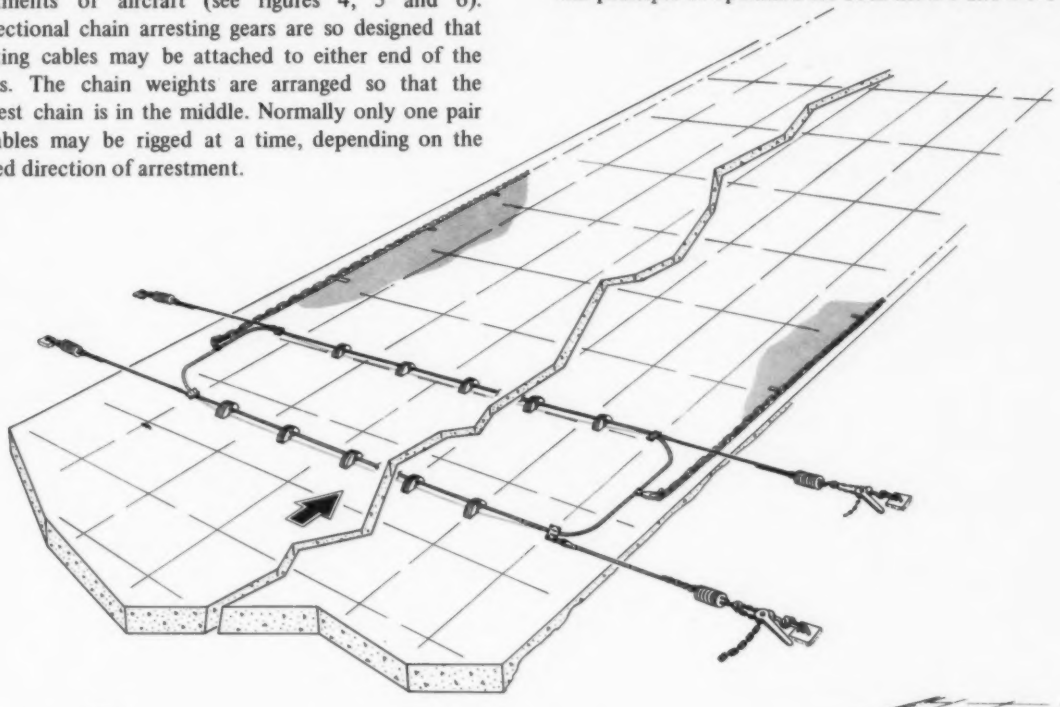


Fig. 4
E-5 Field Emergency Chain Arresting Gear

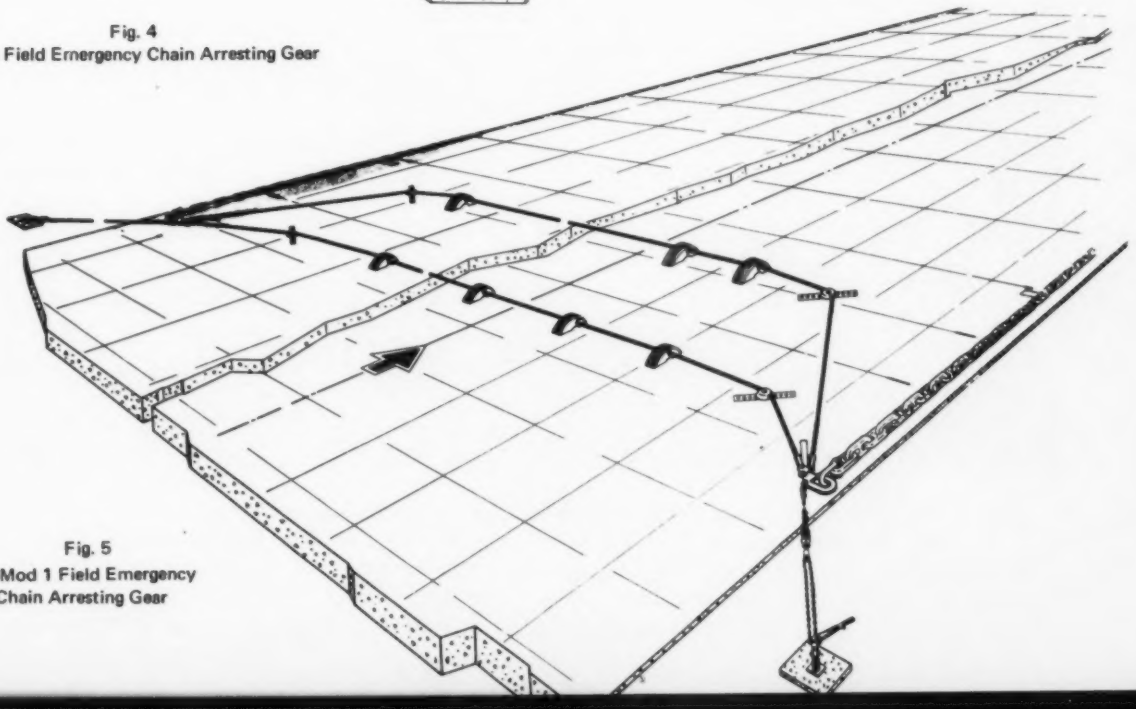


Fig. 5
E-5 Mod 1 Field Emergency Chain Arresting Gear

is that the arresting cable, when engaged by the aircraft arresting hook transmits the energy of the aircraft to the two anchor chains. The arrangement of the chains allows them to pay out gradually, progressively increasing the weight pickup. The energy is dissipated by the gradual pickup of the chain weight until the arrestment is completed.

The E-5-1 emergency chain arresting gear may be combined with the MA-1A barrier in certain installations. In this case the installation will be referred to as the E-5/MA-1A. It is noted that this designation is roughly equivalent to the Air Force designation MA-1A (modified).

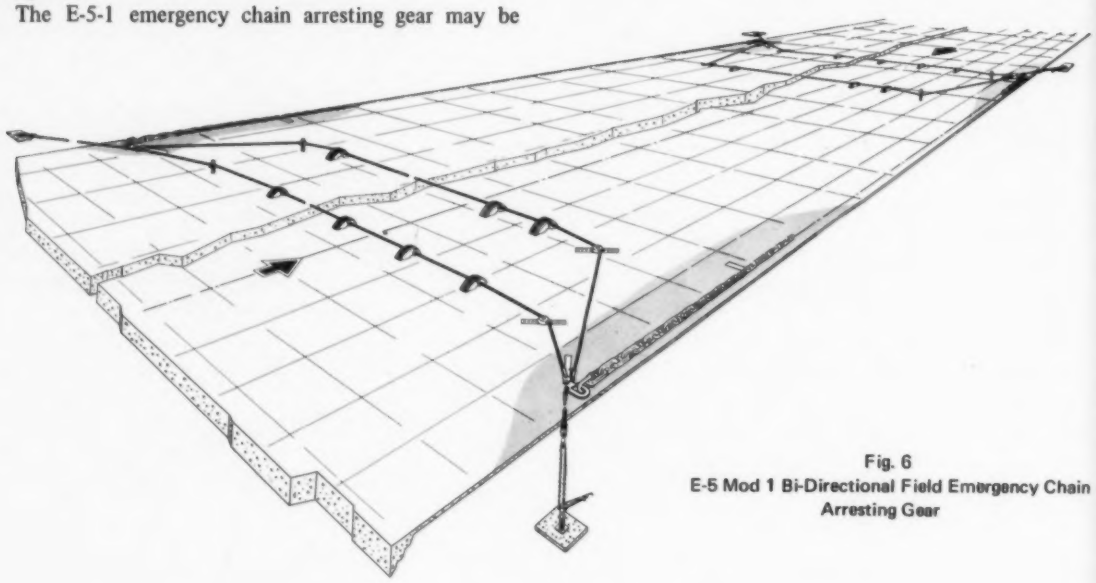


Fig. 6
E-5 Mod 1 Bi-Directional Field Emergency Chain Arresting Gear

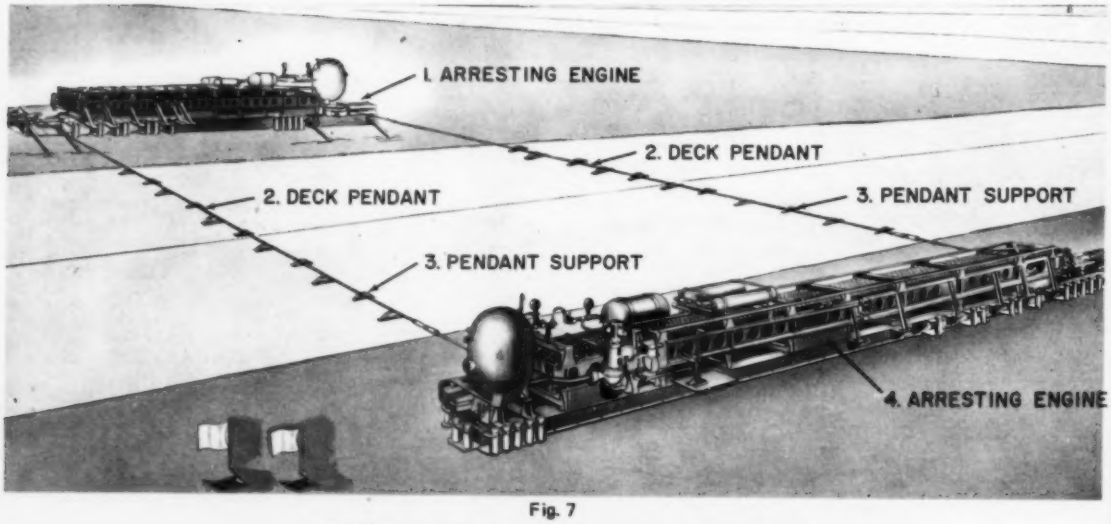


Fig. 7
M-2 Expeditionary Arresting Gear, General Arrangement

M-2 Arresting Gear

The M-2 expeditionary arresting gear, originally developed for Marine Corps use (see figure 7) is a mobile type arresting gear that can be installed on a small landing strip for safe and efficient arrestment of aircraft. (Note: This gear may also be installed on a permanent basis.)

The M-2 uses hydraulic pressure for the absorption of

energy of the landing. Two hydraulic arresting engines are used for each installation with one engine being installed on each side of the runway. Both engines are reeved with wire rope cables and two wire rope deck pendants are run across the runway between engines.

To transport the M-2 arresting gear from place to place, each arresting engine is provided with a detachable fore and aft undercarriage and a detachable stand. The trailer platform is the platform on which the arresting engines are mounted. When the platform is mounted on undercarriages the entire unit becomes a trailer which can be moved overland. When the gear is subsequently installed at another site the undercarriages and stand are removed.

E-14 Arresting Gear (Shorebased)

The E-14 arresting gear (see figure 8) is designed as an emergency standby gear for arresting tailhook equipped aircraft. It may also be equipped with a barrier for arresting other jet aircraft.

It is designed to arrest tailhook equipped aircraft up to 50,000 lbs in weight and at engaging speeds up to 160 kts. Within these limitations the aircraft will be halted within a 1000 ft runout. Engagements may be safely made at up to 50 ft to either side of the runway centerline.

The E-14 works on the water-squeeze principle in which four loosely fitting pistons, equally spaced at the end of the purchase cable are pulled through a tapered (stepped) tube. A portion of the tube is filled with fluid. As the pistons move toward the smaller end of the fluid-filled portion of the tube, the annular orifice between the pistons and the tube diminishes; the resulting hydraulic pressure retards the travel of the pistons until they are brought to a halt.

Two modifications of the E-14 (Mod 1A and Mod 1B) both accomplish essentially the same purpose: provide a greater arresting capability and more leeway for off-center engagement.

E-5/MA-1A Arresting Gear/Jet Barrier

The E-5 arresting gear, already described, is combined in certain installations with the MA-1A jet barrier (refer to figure 9). The barrier consists of nylon webbing which, when engaged by an aircraft nosewheel, raises a cable to catch the aircraft's main landing gear. The cable then pulls out links of heavy anchor chain until the weight of the chain brings the aircraft to a stop.

In the arresting gear/jet barrier combination installation the anchor chain is repositioned so as to be even with the pendant cable so that the tailhook equipped aircraft will start dragging chain as soon as it hooks the pendant. By positioning the pendant about 35 ft in front of the barrier the tailhook will begin to drag chain before the webbing and main cable become entangled with the landing gear.

The E-5/MA-1A installation is also capable of arresting some hookless jet aircraft; however, it is effective only with certain aircraft with tricycle landing gear of proper geometry, adequate ground clearance and as a general rule, without external stores. Continued

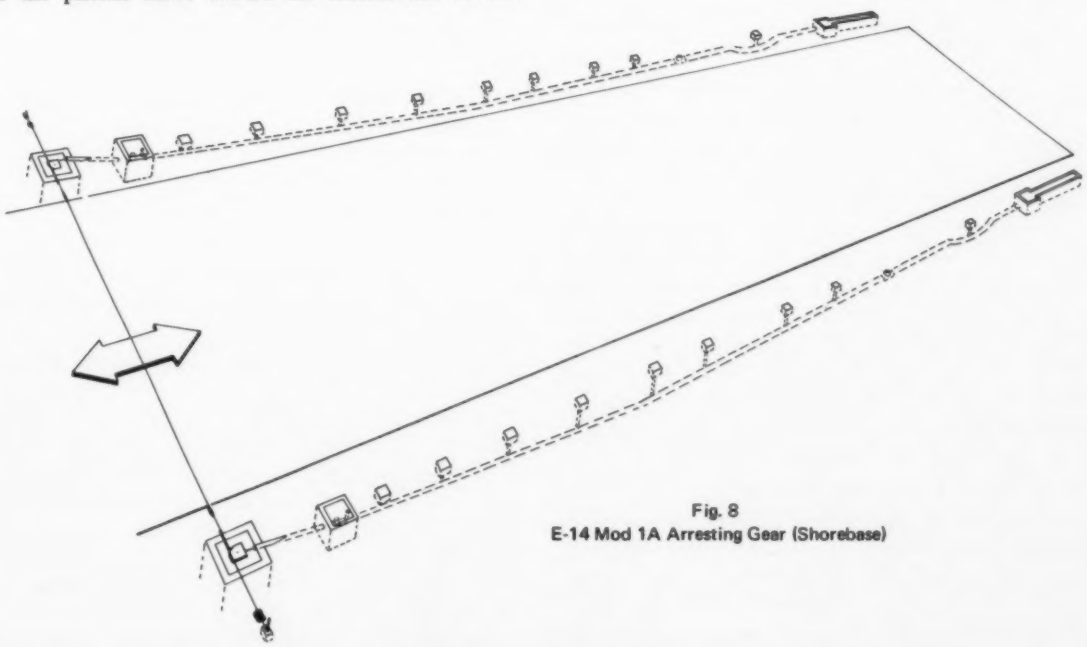


Fig. 8
E-14 Mod 1A Arresting Gear (Shorebase)

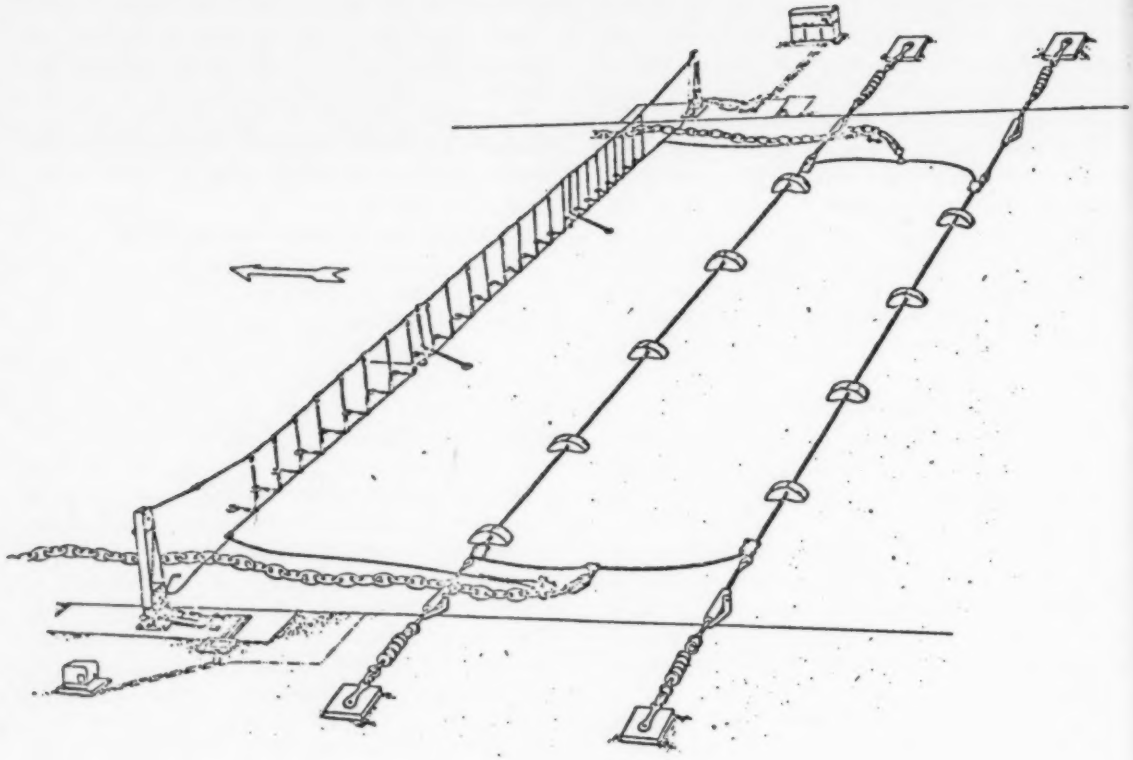


Fig. 9
Type MA-1A Runway Overrun Barrier combined with
Pendant Type Arresting Gear

E-6 Reel Type Arresting Gear

This type of arresting gear is designed as an emergency standby gear for arresting tailhook equipped aircraft; however, the only remaining U.S. Navy installation is at NAS New Orleans.

A single cable drum with a central divider is provided with aircraft type rotary friction brakes in both ends. One of the wire rope purchase cables is wound on each half of the drum. During arrestment, pull out of the purchase cables causes the drum to rotate. A static pressure is applied to the friction brakes which then retard the rotation of the cable drum to effect the arrestment.

E-16 Metal Bender Type Arresting Gear

The E-16 is an emergency standby arresting gear for arresting tailhook equipped aircraft. The only remaining U.S. Navy installation is at NAS Brunswick, Me. Purchase members for this system are steel tapes which are stored in coils on guide rollers in a circular arrangement. Upon engagement the tapes pay out from the center of the coils through a series of linearly arranged offset rollers. Cold working of the steel tapes as they are drawn through the offset rollers produces a retarding force which is applied to the aircraft.

M-21 Arresting Gear

The M-21 (refer to figure 10) is a bidirectional expeditionary recovery system designed for use in SATS (short airfield for tactical support) applications. Recently this system has also been employed as an emergency arresting system at Marine Corps Air Stations. As required for SATS use, the M-21 is a rapid cycle gear that consists of twin arresting units, one on each side of the runway, each of which contains a horizontal drum of nylon tape with a connector at the free end. The connectors are joined by a length of steel cable, which is stretched across the runway and held in a raised position by wire supports for engagement by tailhook equipped aircraft.

Arrestment by the M-21 depends upon the ability of

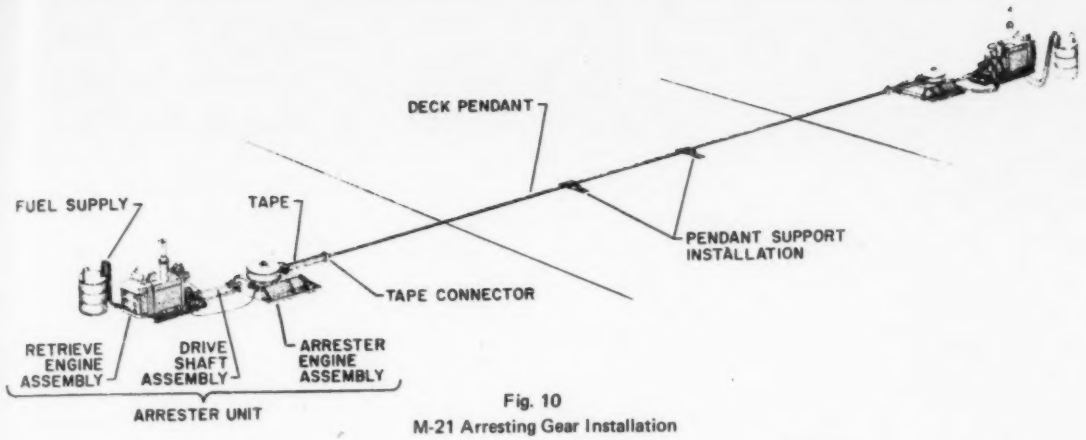


Fig. 10
M-21 Arresting Gear Installation

the energy absorber unit to gradually stop the unwinding of the tape. The energy absorber unit contains a vaned rotor that revolves within pressurized fluid as the tape unwinds, thus creating turbulence in the fluid and thereby providing the arresting action for the system. Included in the unit is a throttle which is set as required for aircraft weight before each arrestment. (Present plans for use of M-21 as an emergency system involve establishing a single, optimum throttle setting.) Power for retraction of the system to the battery position is supplied by a diesel retraction engine.

Summary

Emergency field arresting gear has proven to be a valuable aid in the prevention of aircraft accidents. Pilots should familiarize themselves with the type gear in use at fields where they operate. In this connection, the current IFR enroute supplement and applicable instrument approach plates should be consulted in order to determine the type and location of emergency field arresting gear at specific fields. Reference is also made to the *"Weekly Summary,"* dated 2-8 February 1969, which contains information on the method of marking arresting gear at USN, USAF and Joint-use airfields.

Chart of U.S. Navy Arresting Gear, showing Air Force designations of equivalent gear.

USN Designation	USAF Designation	Remarks
E-5/MA-1A	MA-1A (modified)	Unidirectional, nylon barrier between stanchions combined with pendant type cable and attached to chain type arresting gear.
E-5/E-5-1	–	Chain type. May be rigged bidirectional.
E-6	–	Reel type, bidirectional.
E-14-1	BAK-6	Water-squeeze type, bidirectional.
E-15	–	Two E-27 A-gears, bidirectional.
E-16	–	Metal bender type (series of reels), bidirectional.
E-27	BAK-9	Rotary friction brake, bidirectional.
E-28	BAK-13	Rotary hydraulic, bidirectional.
M-2	–	Morest (2 hydraulic units), bidirectional. (May be installed on a permanent basis.)
M-21	–	Rotary hydraulic operational arrestor, short runout, bidirectional.

Chart 1

Continued

Aircraft Recovery Bulletins Pertaining to Emergency Field Arresting Gear

The tabulation below relates current ARBs (Aircraft Recovery Bulletins) to the various types of emergency field arresting gear. This tabulation is based on information contained in ARB 10-11A (NAEC-NE-431) dated 1 Jan 1969. Pilots and other operations personnel should be familiar with the contents of applicable ARBs for the most effective use of emergency field arresting gear, particularly as they pertain to engagement speeds, weights and limits of off-center engagement.

ARB Application	Applicable ARB
E-5 and E-5 Mod 1 Emergency Arresting Gear (150 to 500 ft span)	47-12B
E-14-1 Emergency Arresting Gear	42-12B
E-15 Emergency Arresting Gear (300 ft span)	44-12A
E-15 and E-15 Mod 1 Emergency Arresting Gear (200 ft span)	48-12A
E-27 Emergency Arresting Gear	45-12A with interim revisions 1, 2 and 3
E-28 Emergency Arresting Gear (225 ft span)	46-12A
M-21 Arresting Gear	45-12A

Chart 2

AIR BREAKS

And Then There Was One

The brakes were released and the F-4B started rolling as the pilot increased the RPM of both engines from 85 to 100 percent. After accelerating some 300 ft down the runway the pilot moved both throttles into AB. The port engine did not respond to the higher power selection so the pilot deselected it. Another quick try also produced negative results. Feeling the situation was too marginal to continue the takeoff, the pilot whacked both throttles to idle. While decelerating through 100 kts, light braking was commenced. Meanwhile, the pilot found time to make three quick transmissions for the barrier but received no answer (he was not on the correct frequency).

At this point the pilot realized that he was not going to receive any outside assistance so he initiated full braking. Then he shut down both engines thereby robbing himself of nose wheel steering. (The NATOPS Manual says to keep the starboard engine running in idle to provide power for nose wheel steering.) Quickly thereafter the starboard tire blew and the *Phantom II* commenced a right drift. Any thought to deploy the drag chute was lost in the effort to keep the craft on the runway. The pilot now applied excessive port brake and blew that tire also.

The pilot was unable to maintain directional control and the aircraft swerved off the starboard side of the runway into soft dirt collapsing the port MLG. The F-4B quickly came to rest 15 ft off the pavement.

The accident involved a choice of decisions and one of two was required almost instantly. NATOPS procedures for the F-4 allow either takeoff or abort with one AB failure. Since the pilot elected to abort, he should have immediately killed the port engine while idling the starboard one, then deployed the drag chute and put down full flaps. Except for being on the wrong radio frequency for barrier assistance, he was correct in thinking about such help in this last-ditch effort to avoid or at least minimize damage. It does not take much pressure on the brakes at 100 kts to lock the wheels and to blow the tires. This was a poor maneuver without the assistance of the drag chute, full flaps and nosewheel steering. ◄

A major mishap in the making was . . .

Build Your Own Story

By CDR C. E. Willis, RCVAW-15

Strike out, insert or substitute wording as desired.

IT WAS a (nice) (awful) (good) (bad) (sad) day (in) (at) ____. An AME had just placed a LOX converter on a bench outside the shop to vent. There were several full converters on the bench awaiting installation for the next launch. A considerable quantity of flammables was stored nearby.

LOX from the vent valve was dripping on the asphalt and a (small) (large) area was (wet) (frozen). The maintenance officer walked around the corner of the building with a lighted cigarette just as a plane captain drove up in a tow tractor. An explosion was followed by a fire and ____ men were killed, ____ men were injured, one tow tractor and the shop were destroyed.

Investigation revealed that the explosion and fire were caused by (a) (b) (c): (Select one or more)

a. The maintenance officer's cigarette.

b. A spark from the hot exhaust of the tow tractor.

c. Spontaneous ignition of the LOX on asphalt, a petroleum product.

A JAG manual investigation also determined that there was a lack of supervision at the (squadron) (department) (division) (branch) level and recommended courts martial for ____ officer(s) and ____ petty officer(s) in the supervisory chain.

The story ends here with a moral established. It was a bad day (at) (in) ____.

A better middle (and beginning) to this story might go like this: The maintenance officer recognized the hazardous situation and took action to prevent the possibility of such an accident. He established an isolated area for handling LOX converters and installed prominent "No Smoking" signs. He arranged to have all petroleum products and other flammables moved to a remote location and provided drip pans. He also established a procedure to ensure that all personnel receive instructions concerning the hazards of LOX and gaseous oxygen handling.

Up or Down?

Ah . . . that is the question!

By LCDR J. F. Hill
Power Plants Branch Officer
Naval Safety Center

WHAT is the status of the aircraft? Is it *up* or is it *down*? This is a question which must be answered thousands of times daily in naval aviation. Ideally, there is only one answer – the correct one. In reality the correct answer eludes us in far too many cases. Many accident reports on file at the Naval Safety Center show that we cannot afford to come up with the incorrect answer (refer to the accompanying box).

How Can We Consistently Come Up With the Correct Answer?

Most of the time the answer is simple and clearcut: an aircraft has a discrepancy which does not meet established criteria for flight; therefore, it is *down*. In this connection we have a large body of established criteria regarding the airworthiness of aircraft. It is the result of our best efforts in the area of design, engineering, manufacturing – and operational experience. Much of the criteria leaves little room for misinterpretation, e.g., when an aircraft engine has *X* number of operating hours, it must be overhauled. Other criteria is less definitely established, nevertheless, it is usually sufficient to provide effective guidance to knowledgeable maintenance and operating personnel. What then is the problem?

First, the existence of the problem may not be adequately recognized or if it is, the solution is not apparent. Moreover, at times there is an honest difference of opinion as to the weight which ought to be accorded specific discrepancies. Finally, we often have to take operational comitments into consideration.

Recognizing the Problem

We have many individuals who tend to hedge when it comes to measuring the aircraft against the established criteria. The pilot who circles the *up* arrow on the yellow sheet and then writes: "For pilot info: slightly dragging left brake," may be performing a correct and highly desirable function . . . keeping everyone informed of the condition of the aircraft . . . or, he may be merely passing the buck via a mealy-mouthed write-up. In any event, the pilot is probably in the best position in this case to assess the extent of the problem and if he defaults in his duty, who will pick up the ball and run? The point is the impact of what often should be a blunt and forthright statement, i.e, "The aircraft is *down* – left brake drags," is hedged at times by a pilot info note. We ought to mention, too, certain adjectives which are frequently found on yellow sheets: "Small, minor, insignificant," etc. We don't say such words should not be used; because, after all, they *can* be used effectively to indicate more exactly the degree of the problem. However, many of these words have a permissive implication and are sometimes employed for just that reason.

Most aircraft systems include gages, dials and indicators of one type or another which, if not ignored, will give some good indications of system malfunctions. Be that as it may, assessing the condition of an aircraft system often requires an expert knowledge of mechanics, superior judgment and the moral courage to tell it like it is – on the yellow sheet.

If a pilot does not possess the requisite mechanical

From NavSafeCen Files

• *The accident:* The aircraft departed on a cross-country flight under actual instrument conditions. The pilot acknowledged a radar vector to a new heading. Communications were lost. The aircraft subsequently crashed. Alfa damage/fatal injury.

Investigation results: It was determined that the aircraft had a history of attitude gyro problems as evidenced by repeated yellow sheet gripes during the preceding month. Records revealed five discrepancies, ranging from a 10-degree right-wing-down error to complete failure. In all cases the maintenance department had been unable to duplicate the malfunction on the ground.

• *The accident:* The aircraft experienced a complete electrical failure while on an IFR cross-country flight. The emergency power package (EPP) would not extend. The aircraft subsequently crashed. Alfa damage/major injury.

Investigation results: It was determined that the aircraft had a past history of electrical failures. Previous failures had been in the main electrical system and in the EPP operation and extension.

• *The accident:* During climbout the student reported odors in the cockpit, then smoke, then flames. The aircraft subsequently crashed. Alfa damage/fatal and major injury.

Investigation results: On the previous flight the aircraft had been griped for a strong burning smell in the cockpit. Corrective action was: "Pulled visual inspection on the engine and accessory section; airframes conducted their inspection; aircraft was turned up; request maintenance test hop."

• *The accident:* The pilot experienced inflight control failure and got a fire warning light. The aircraft subsequently crashed. Alfa damage/no injury.

Investigation results: It was determined that since installation the engine had a history of seemingly uncorrectible EGT, RPM and fuel flow discrepancies. Other, less repetitious discrepancies included fumes in the cockpit and engine overspeed conditions. The EGT was recorded on eight different flights during the preceding two months as being too low. Three instances of fluctuating EGT, RPM and fuel flow were also reported. On five separate occasions, including the final flight, fumes in the cockpit were reported.

• *The accident:* The pilot filed for an extended cross-country flight under IFR conditions, with several enroute refueling stops and a passenger stop. Shortly after takeoff on the first leg, the attitude gyro failed in both cockpits. After dropping off the passenger at the second stop, the pilot departed on another leg of the flight. He subsequently crashed while executing an instrument departure in actual instrument conditions. Alfa damage/fatal injury.

Investigation results: The passenger (on the first two legs of the flight) stated that the pilot's reaction to the failed attitude gyro, experienced after the first takeoff, was one of little concern . . . he stated that "the weather is forecast to remain VFR for the weekend." The passenger further stated that the attitude gyro had not functioned properly at any time after its initial failure.

There are many other reports on file at NavSafeCen of a similar nature. In most of the accidents recounted here it is apparent that the aircraft should never have been certified for flight. Could it happen in your unit?

knowledge – and many don't (considering the complexity of today's aircraft) – it is incumbent upon the pilot to consult with experienced maintenance personnel in order to ensure an effective yellow sheet write-up. Maintenance personnel also have an equal responsibility to report aircraft discrepancies, whether it be a plane captain who notes a questionable condition on a daily preflight, an experienced mech who notes a problem during a periodic check or a line mid-watch who spots fluid leaking from the aircraft – all have a responsibility to ensure the discrepancy is fully reported and documented.

To summarize, correct decisions cannot be made on the *up* or *down* status of aircraft unless we take positive

steps to adequately identify discrepancies. One area where serious problems may be overlooked is in the case of repeated gripes. It is important enough to deserve separate comment.

Repeated Gripes – A Red Flag

Any item which is repeatedly griped on the yellow sheet should serve as a red flag warning. It matters not that it is a seemingly minor discrepancy. The fact is, it could not be *really* minor if the repeated efforts of the maintenance department have been ineffective in eliminating it. Therefore, whenever the remedy cannot be established for a repeat gripe, large or small, take warning – it is a pretty good indication that there is something seriously wrong, either in the aircraft, the maintenance or operating personnel procedures or in the maintenance system. In these cases the status of the aircraft should become a continuing concern at the highest levels of maintenance department supervision. This does not necessarily mean that the aircraft must be arbitrarily *downed* but in many cases it should be until all avenues of expert investigation and assistance have been exhausted. We refer now to the expertise available from the local AMD, the manufacturer's representative, the NARF, staff maintenance and many other sources.

Many discrepancies are not susceptible to duplication on the ground. This is sometimes a contributing factor in repeat gripes. In these cases an additional flight or flights may be necessary to more definitely identify the problem *and* the correct fix. The big hazard here is that the inflight check will be regarded as a minor requirement and will be assigned to a pilot as a routine collateral duty during the next scheduled mission – when, because of the persistence of the problem, it should rightly be regarded as the primary reason for the next flight. Utilizing regularly scheduled flights to make certain inflight checks for maintenance purposes is a valid procedure but it ought to be severely questioned in the case of repeated gripes which have not been correctable through established maintenance procedures. It follows that if the repeat gripes are properly recognized as a serious problem, it is also a matter serious enough to warrant the attention of a properly qualified maintenance test pilot, accompanied by experienced maintenance personnel, when appropriate. The point is, when an aircraft or aircraft system is repeatedly griped, for the same or similar reason, it's trying to tell us something. *We ought to listen!*

Operational Requirements

This is another factor which often figures into the *up* or *down* status of an aircraft. Our problem is to ensure that it is figured correctly. There are times when a pressing operational need will dictate launching an aircraft with known discrepancies when it would otherwise qualify for a *down* status. This is a perfectly valid concept; however, such decisions must be made at a responsible (and authoritative) level, based on the best information available. Such decisions should never be the mere result of default in reporting or assessing discrepancies.

From time to time the tempo of operations may pick up as a result of operational requirements. Almost invariably personnel assigned to the unit will be caught up in the spirit of the general upswing and will tend to manifest the traditional "can do" attitude. This is fine. It's the spirit which wins wars but it does create a potential hazard. A pilot or maintenance man, in the spirit of expediting operations, may discount or ignore seemingly minor discrepancies without subjecting them to adequate processing in the established system, e.g., failure to gripe a navigation radio because the pilot knows the next flight out will be in VFR conditions. This can only short-circuit the decision-making process.

Soul Searching in Order

The decision-making process by which we answer the question, is the aircraft *up* or *down* is complex. We don't presume to know all the answers as to how this process should operate. It is apparent, however, that this decision-making process should be the subject of a soul-searching and continuing review at the operating level. If it is to be an effective process, it must include:

- Pilots and maintenance men who tell it like it is on the yellow sheet and other aircraft records.
- Respect for established criteria. Granted, certain criteria may be subject to change depending on operational requirements. This does not mean, however, that the criteria can be ignored. Rather, it means that when operational requirements dictate less stringent criteria, it becomes all the more important that such criteria be fully respected.
- A positive approach to the identification, reporting and assessment of aircraft discrepancies, especially those of the repeat variety.
- Recognition that honest differences of opinion do exist concerning aircraft discrepancies. In this connection, unit leadership and sound supervision should provide positive safeguards to ensure that the maximum knowledge, experience and judgment is brought to bear on the problem. If this means bucking the problem all the way to the maintenance officer or C.O. – then, so be it!

Up or *Down* . . . this is a question which demands the best judgment of pilots, maintenance and operations personnel. Overlooking, ignoring or merely tolerating aircraft discrepancies, will not meet this demand!

MURPHY'S LAW*

BAD BATCH

THIS END FOR NIGH
SED BEADS IDENTIFY
TO IGNITE EITHER SIGNAL
1. TEAR CAP FROM END TO BE IGNITED.
2. FLIP PULL RING OVER SIGNAL RIM.
3. PUSH
4. IF SEAL DOESN'T BREAK, PUSH RING UNTIL IT BENDS AGAINST CASE.
5. FLIP BENT RING BACK TO ORIGINAL POSITION AND USE AS LEVER TO BREAK SEAL.
6. IGNITE SIGNAL BY QUICK PULL ON RING.

Photo shows mislabeling of flare ends.

THIS signal (Mk 13 Mod 0) was discovered by a crewmember in a VP squadron. The end with the ring of raised knobs around it (to denote the night end) is labeled "For Day Use" and has "Day Smoke" on the cap. The other end is labeled "For Night Use" and has "Night Flare" on the cap.

When lit off, the end with the raised knobs proved to be the night flare. This flare was labeled backwards during manufacture. Murphy strikes again!

Other activities should give their flares a good onceover to determine if they, too, received any such Murphied flares.

* If an aircraft part can be installed incorrectly, someone will install it that way!

LETTERS

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

To err is human, but it takes a better excuse the second time.

Anon.

KUDO

Los Angeles – In a rare burst of enthusiasm, for a guy whose job is making aviation readable for others, I want to informally pass on my admiration for the editorial effectiveness of APPROACH. The impetus for this letter was provided by the March APPROACH which I just finished. It was excellent. Safety has never been more interesting and readable. As a result, the message you want transmitted comes through loud and clear.

C. M. Plattner
Engineering Editor
AVIATION WEEK
& SPACE TECHNOLOGY

'A Bit Unusual'

FPO New York – Re the February 1969 APPROACH article "A Bit Unusual": outstanding article, hairy to say the least. The middle photo on page 30 shows the port main landing gear missing while the bottom photo shows the starboard main landing gear missing.

Incidentally, what happened to the plane? From the statement on page 33 that the RIO's seat was not recovered, it sounds like they cut it loose.

CDR R. H. Healy
USNS, Roosevelt Roads

● The bottom photo represents a classic case of negative flop-itus, a condition caused by gremlins who inhabit print shops and take great delight in reversing photo negatives while the engraver is busy elsewhere. However, even a gremlin can goof – he missed the same photo on page 48 in the table of contents.

In addition to phone calls and drop-in visits, we also had letters from CAPT A. R. Groves, NAS Atlanta; CPL Robert J. Armstrong, MCAS Beaufort, S. C.; CAPT Robert Huberman, USAF, Alexandria, Va.; AM2 Charles H. Morris and AM3 Samuel Madoxx, Coast Guard Repair Base, Elizabeth City, N. C.; ADR1 R. M. Levan, Ops Maintenance, NAS Oceana; and Mr. George Clare, Systems Safety Engineer, Vought Aeronautics Division, LTV Aerospace Corp., Dallas.

As for the plane, the investigation report states that the barricade was subsequently cut loose, as you surmised, and the aircraft was lost at sea.

Visibility Requirements for VFR Flight

NAS Kingsville, Texas – Am I to receive a prize for being among the first 300 NATOPS officers to invite your attention to an inferred misquote of our OpNavInst 3710.7D?

I am referring to the excellent ACM article in the February issue. A nit-pickin' point that doesn't detract from a much needed proclamation, the inference is that the visibility rules change at 14,500 ft as opposed to the correct 10,000 ft.

LCDR W. D. Storey

● The inferred misquote which you mention was a straight report on the content of paragraph 750 (Acrobatics), subparagraph e. 2, as it applies to acrobatics. It was not intended to imply anything else but it is conceded that the inference you mention could be drawn.

We have reviewed OpNavInst 3710.7D (an up-to-date copy corrected through Ch-4 dtd 10 Mar 1969) and it still says that acrobatics will not be performed "when horizontal visibility in all directions is less than 3 miles (5 miles above 14,500 ft)." ***However, it has been determined informally that this is an oversight and that a future change to OpNavInst 3710.7D will change this to read: "When horizontal visibility in all directions is less than 3 miles (5 miles above 10,000 ft)."***

Weather Information

If you have any questions concerning weather and its relation to naval aviation, which you cannot find satisfactory answers for, send them to the Commanding Officer, Fleet Weather Central, Naval Air Station, Norfolk, Va. 23511, who has volunteered to do the necessary research and supply the answers.

Parachute Release Techniques

NAS Lemoore – Our previous ConUS survival training taught us that koch fittings were to be released in overwater parachute descents when the feet touched the water. This supposedly precludes inadvertent release from great altitudes if the pilot misjudges his height above the water.

Upon arrival in WestPac, paramedic instructors invited for squadron lectures on SAR helo procedures described a new method being taught. The raft is deployed during the descent and the hands are positioned by the koch fittings

Testimonial

NAS Quonset Point, R. I. – During an aircraft respot in an NAS Quonset hangar, a plane captain, due to inattention, almost crushed his toes while opening the hangar door. His safety shoes prevented serious injury. Please add this to your file of testimonials.

LT A. B. Daunis
Aviation Safety Officer

● This is, indeed, another testimonial to the value of wearing safety shoes. See also p. 34, April APPROACH.

instead of raising the guards and holding the fingers on the release mechanism which must be the case when using the feet-in-the-water method. The pilot watches the raft hanging 25 ft below him and as it touches the water, the guards are raised and the release mechanisms are actuated. Because of the descent rate and the time delay to actuate the koch fittings, this method should release the pilot approximately 5 ft above the water allowing the chute to blow away from him. This method supposedly prevents inadvertent high altitude release since the pilot does not raise the guards until he knows he is 25 ft above the water, prevents dragging since the pilot is free of the chute prior to water entry and keeps the pilot from becoming entangled in the shroud lines, thereby expediting the efforts of SAR personnel.

DWST (Deep Water Survival Training) attended about one month prior to WestPac deployment taught the feet-in-the-water method. What is the official word?

LT P. E. Mullowney
Aviator's Equipment Officer
VA-97

● The Naval Safety Center queried Naval Air Systems Command on the methods described in your letter and recommended that an evaluation of this technique be made by Naval Aerospace Recovery Facility, El Centro. We have just received El Centro's evaluation of this parachute release technique as reported to NavAirSysCom.

"Equipment Used: Anti-exposure suits, protective helmets, oxygen masks, XIT harnesses, reserve parachutes, NB-7 parachutes with deflation pockets and koch parachute canopy releases, Mk-3C and LPA-1 life vests and rigid seat survival kits with LR-1 life raft and simulated survival equipment with 25 ft lanyard – total weight, 27 lbs.

"Test Procedures: Six live jumps were conducted at the Salton Sea Drop Zone. The jumpers exited the aircraft at 5000 ft, deployed the raft and equipment at approximately 1000 ft above the water and then positioned their hands at the parachute release fittings without raising the guards. The test jumpers were instructed to watch the survival equipment container hanging 25 ft below them and, when they could see the container contact the water, they were to raise the release fitting guards and release the parachute canopy.

"Test Results: In reviewing the photo coverage, it was evident that oscillation of the parachute commenced upon deployment of the raft and equipment. This created a problem for the test subject as it became impossible to keep the equipment container in sight since the pendulum motion at times placed the equipment container behind the jumper's body. This, in addition to impairment of downward vision by the inflated life vest, negated accomplishment of the procedures under evaluation.

"None of the six test jumpers were able to ascertain the moment the container contacted the water. This resulted in no actuation of the canopy releases until the test jumper made water contact with only one recorded instance of suspension line entanglement.

"Recommendation: That the method being taught by the paramedics as described be discontinued. The empirical data acquired through conduct of parachute jumps proves that this method, as tested by experienced test parachutists under ideal conditions, is impractical. An emergency bailout/ejection situation with inexperienced personnel could result in a highly probable compromise to personnel safety by inadvertent, premature canopy release." ◀

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Washington, D. C. 20402

Please send APPROACH (NavAir 00-75-510) for one year to the following address. Enclosed is a check or Money Order for $7.00. ($8.75 for foreign mailing.)

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Vol. 14 **approach** No. 11

RADM Roger W. Mehle
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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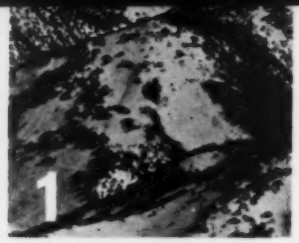

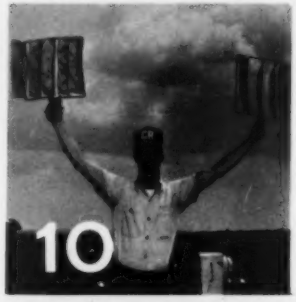

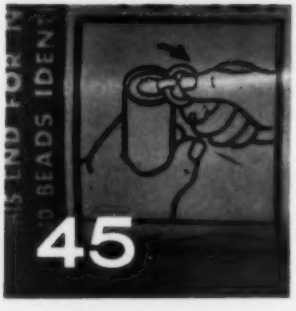

NavWeps 00-75-510

Purposes and policies: APPROACH, published monthly by the Naval Safety Center, presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ.

Photos: Official Navy or as credited. Non-naval activities are requested to contact NavSafeCen prior to reprinting APPROACH material.

Correspondence: Contributions are welcome. The right to make editorial changes to improve the material without altering the intended meaning is reserved. Reference to commercial products does not imply Navy endorsement. Views of guest written articles are not necessarily those of NavSafeCen.

Distribution: Requests for distribution changes should be directed to NavSafeCen, NAS, Norfolk, Va. 23511. Phone: Area Code 703, 444-4279, Att: Safety Education Dept., IF YOU ARE A PAID SUBSCRIBER, address all renewals and address changes to Division of Public Documents, Washington, D. C. 20402.

Subscriptions: Single copy 60 cents, 1-year subscriptions $7.00; $1.75 additional annually for foreign mailing.

Printing: Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. Library of Congress Catalog No. 57-60020.

Next Month

Ground Resonance
Let's be Articulate

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Credits

The covers of APPROACH for this month are devoted to the epic flight of the NC-4 in May 1919. The cover painting is by CDR Ted Wilbur, courtesy of the artist.

The inside back cover copy is from the book 'The Flight Across the Atlantic' published by the Curtiss Aeroplane and Motor Corp., 1919.

Both the book, and the medal shown on the back cover, are through the courtesy of the permanent collection of the Norfolk Museum of Arts and Sciences, Norfolk, Va.

The Flight

by LCDR Albert C. Read, USN, Pilot of the NC-4

THE 17 men who flew from Trepassey May 16 had, I think, one feeling in common. They appreciated the quality of the NC boats and their equipment. A big task was to be done. These flying boats represented big preparations to meet it.

To the flyer this sensation was gratifying. It was good to feel that in scale and effectiveness the expedition of which you were a part marked an advance over previous ones. It was good to realize that between you and the ocean was a hull with which you could land and navigate on almost any sea. It was comforting to know that communication with the world was assured by a radio apparatus of unusual excellence.

The roominess of the ships also made its subtle reassuring impressions. In the navigator's cockpit of the NC-4 I could lean forward at my lookout or sink back for a smoke. I could climb out of my seat and down to the passages communicating with the pilots. I could, though I never chose to, stretch out and sleep. Unconsciously, one got from such roominess a sense of the size and strength of the boat and a feeling of confidence in it.

There were difficulties in connection with the transatlantic flight. There were also unusual compensations. The Trepassey-Plymouth voyage has been compared with the great voyage of 1492. Few realize how much harder the first trip from Europe to America by water was than the first trip from America to Europe by air. Columbus was proving to the world something which *he* believed. We were proving to the world something the world believed itself. Columbus was almost alone in his theories. We had the support of almost every living flyer, land or marine. Columbus had 70 days of difficulties – we had two. Columbus had a crew in mutiny at the idea of going forward – any member of any NC crew would have mutinied at the thought of turning back.

The Navy-Curtiss boats were efficient in flight. At first there was a natural doubt with respect to the motors. We hoped nothing would go wrong, but perhaps it might. As hour after hour passed, however, and the engines thundered on with never a miss or faltering, we felt we had something behind us which would not fail. After several hours we could have run on three motors, and toward the end of the flight it would have been possible to go successfully on two.

The extension of this motor efficiency will be a point of departure for future work. Improvements such as the use of gears and the installation of separate oil systems for each engine will improve the motors we used for the transatlantic flight.

From such details we should go to the consideration of higher horsepower and its distribution with the larger craft which this will mean.

Will the advance be rapid? Will there be changes as important to the world as the discovery of a hemisphere? Tomorrow must answer for itself. Those who have assisted in the first ocean flight have, I hope, furthered the cause of aeronautical education; shown the efficiency of naval flying; and aroused the public to further possiblities. As for the future, this is certain: any one who today declares anything impossible is apt to bark his knuckles. Personally, I have seen so many incredible things accomplished, that I am willing to believe that much, which now seems impossible, will be done. I have often wondered if Jules Verne actually believed the marvels he prefigured in his tales or if it was just imagination with him. Certainly he often hit the nail on the head. Perhaps prophecies which seem amusing today may, like his visions, find a quick fulfillment. Perhaps we are not even prophesying up to the future, and require another Verne or Wells to shake us out of our mental slavery of the present.

A C Read

May 1919

Bronze medal struck in commemoration of the flight and given to the NC crew members and Navy Department personnel involved in design and production. The presentation took place at a dinner given by Glenn Curtiss, July 10, 1919.